DRAGON USER

The independent Dragon magazine

September 1986

Contents

Editorial

Rumours get circulating from time to time, like the rumour which said that Dragon User would cease after June (circulated among newsagents), that so-&-so isn't going to produce any more Dragon software (which has often proved to be true, but not as often as it has been put about), that the Dragon is dead (after Dragon Data closed down in 1984) . . . now someone else has started a rumour that our publishers 'don't like' Dragon User, whatever that is supposed to mean.

This concerns us, because it is vague notions like that which cause alarm and despondency. Now listen here: the publishers brought in new staff to keep Dragon User going, a new computer to help with the administration, and brought all the subscriptions under their own control to avoid problems. While the demand exists, so will Dragon User; the demand comes from users. So don't be discouraged by rumours — none of us want them to become self-fulfilling.

On a much jollier note, a well known electronics company has some Dragon 32 reference cards to give away. See page 4 for details.

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How to submit articles

The quality of the material we can publish in *Dragon User* each month will, to a very great extent depend on the quality of the discoveries that you can make with your Dragon. The Dragon computer was launched on to the market with a powerful version of Basic, but with very poor documentation.

Articles which are submitted to *Dragon User* for publication should not be more than 3000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program returned you must include a stamped addressed envelope.

Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP.

Lost adventure

CAN you help us with the Dragon adventurer? We have received an order from Alloa for *Colossal Cave* with a £6 postal order: unfortunately, no address was included.

So if you live near Thorne Road post office and haven't received your cassette, please write or phone 061 225 4674 and identify yourself. Your cassette is waiting.

Malcolm Cowan
Cowan Software
23 Bristol Ave.
Levenshulme
Manchester 19
M19 3NU

Caring needed

CAN anyone help with software/ hardware/adaptations for use by handicapped children?

S. Beardwood
Westgarth Childrens Home
79 Victoria Rd.
Elland
W. Yorks.

Banbury club

I WOULD be grateful if you could place in your letters column a call for other users to join a new Dragon club in Banbury and the surrounding area. They should contact me at my address or on (0295) 53300.

J.H. Plester
47 Easington Rd.
Banbury
Oxon OX16 9HJ

Back issues

IN ANSWER to the inquiries about back issues, it's slipped your mind that Peaksoft have acquired Dragon User back-issue stock. Prior to January 1986, the issues still available are: 1984; Feb/Mar/May/Jul/Nov/Dec; 1985: Jan/Feb/Mar. They are priced at £1 each, post included.

We do try to maintain a complete collection of worthwhile Dragon periodicals, and I hope you won't mind if I also mention that we can offer copies of all editions of Dragon Monthly, and printer dumps of Radio Dragon.

Harry Whitehouse
Peaksoft
48 Queen St.
Balderton
Newark
Notts NG2 3NS

Correct Pokes

THE POKES listed for *Madness and the Minotaur* in the July issue are somehow wrong. Here are the correct ones:

```
POKE 8772,134   ($224 hex)
POKE 8773,255
POKE 8774, 151
POKE 8775, 5
Machine code:
$2244 LDA #$FF
$2246 STA <$05
```

The poke 8728 sets the number of points that need to be scored to win. I would like to thank Mrs. Pauline Harpson for pointing out the errors to me.

Simon Hargrave
Crawley Hill Farm
Ulcy
Dursley
Glos. GL11 5BH

Hyperun error

THANK YOUR for publishing my letters "Pokes galore" and "Screen change" in the Feb and July issues of DU. Thank you also to everyone who has bought my *Hyperun* program, which is still available at £3.50. However, there were unfortunately some errors printing, and I have come up with shorter versions of 'A' and 'B' instead.

Program A:

```
SKIPF:POKE 126,4:POKE
127, 0:EXEC 46941
```

Program B:

```
10 FORK=31000 TO 31010:
READM:POKE K,M:NEXT:
EXECK-11:DATA 189,160,146,
134,57,183,1,103.126,131,113.
RUN
```

In "Screen Change", the PRINT@ Ø command should be followed by a comma not a full stop. During the DATA statements, there are some uncrossed zeros so I'll point out that there shouldn't be any letter "O"s. This should clear up any confusion.

Paul Burgin
18 Moorcroft Road
Fulwood
Sheffield
Yorks S10 4GS

Any old OS-9

POSSEDANT le logical "Stock Recording System" et un Dragon 64, et je desirerai me procurer le disque "OS9 Operating System" ainsi que son maniuel.

Pourriez-vous m'indiquer ou puis je trouver ces derniers en Grande Bretagne; j'ai deja ecrit chez "Compusense", "John Penn" et "Costswold", mais malheureusement ces societes ne les possedent plus.

Veuillez agrier, Monsieur, l'expression de mes sentiments distingues.

Mr Patrick Souloumiac
4 Allee du Capitaine Bonson
21150 Venarey-les-laumes
France

Get Serious

I HAVE enjoyed your magazine during the past two years. When are you going to get smart and start catering to the serious user? The Dragon has the capability, with OS-9, which is being used in Israel by businesses, doctors, and engineers. How about a review of "The Banker" board, which expands RAM to 256k without lugging Flex along like a mother-in-law? As a games machine, the Dragon is last year's toy.

Harry C. Taylor II
Chemical Engineer
Hamaagal 32
Rimon
55402 Kiriat Ono
Israel

WE have a problem with OS-9: nobody in the UK is licensed to market it, or, if anybody is, we have yet to hear about it. We would like more contributions and reviews on professional systems, and would be most interested to hear from anyone who can help on either subject.

Printer connector

OVER the last few months there have been several inquiries both to 'Letters Page' and 'Dragon Answers' concerning the interfacing of the Tandy TP-10 Printer with the Dragon computer.

The Tandy Tp-10 is a thermal Printer which is low priced, compact and is ideal for listings.

As the Tandy TP-10 needs a serial input, a Parallel to serial coverter is needed. I have constructed a converter to meet this requirement, and if any one would like details to build this converter I will supply these at a cost of £1.00.

Alan Johnson
23 Ashmole Road
Abingdon
Oxon OX14 5LH

Puzzle listing

APOLOGIES to Gordon Lee and the gamers for leaving this listing out of the August puzzle page.

```
 10 FOR N=11112 TO 31426
 20 S=N*N
 30 S$=STR$(S):S$=MID$
    (S$,2)
 40 SUM=0:PRODUCT=1
 50 FOR F=1 TO 9
 60 V=VAL(MID$(S$,F,1))
 70 SUM=SUM+V:PRODUCT
    =PRODUCT*V
 80 NEXT F
 90 IF SUM<>45 OR PRODUCT
    <>362880 THEN 110
100 PRINT N,S
110 NEXT N
```

Dragon User People's Chart

IF THIS goes on, we'll be re-naming *Juxtaposition* "Fixtaposition". The Barons of Ceti V's popularity just continues to reassert itself. See Mike Gerrard's Adventure Trail this month for some hints, if your nerves are about to crack.

Or you could write to Paul Davidson of 211 Dunminning Road, Glarryford, Ballymena, Co. Antrim, N. Ireland BT44 9PP. He hasn't sent an anagram, exactly - he just wrote in the space "I have just finished Juxtaposition, and if anybody wants any help, send me an SAE and I will help them". Ta, Paul. No prizes, though.

A special mention to Keith Turner, who not only used most of his top three letters, but listed the ones he did't use, as well. They say *DIDOOP*. But this month's anagram winner is S.A. Siddiqui of Chiswick, London, who not only used all his letters up, but says exactly what the editor is always saying — 'The Dragon world should unite not fight'. You see, crawling works. Sometimes.

Found another great program? Discovered new depths in an old favourite? Send us your list of five favourite programs — games, applications, facilities, disk or tape — in order of preference, on the form printed here (or make your own — thousands do).

Moreover, if you can devise a witty or apt anagram from the letters of your own favourite three (you need not use all the letters), you may be the winner of £25-worth of Microdeal software.

Results August 1986

1 Juxtaposition ....(Wintersoft)
2 Shocktrooper.................................(Microdeal)
3 Bean Stalker.............................(Micro Vision)
4 Jet Set Willy ....(Software Project)
5 Rommel 3D ....(Microdeal)

Chart Eight

Voting for Chart No. 8 closes at 1pm on Friday, 19th September 1986. Entries recieved after that time will not be eligible for inclusion in that month's voting. The editor's decision is final. Only one entry per individual per month will be allowed.

My top 5: Voting Month 7

1 ....

2 ....

3 ....

4 ....

5 ....

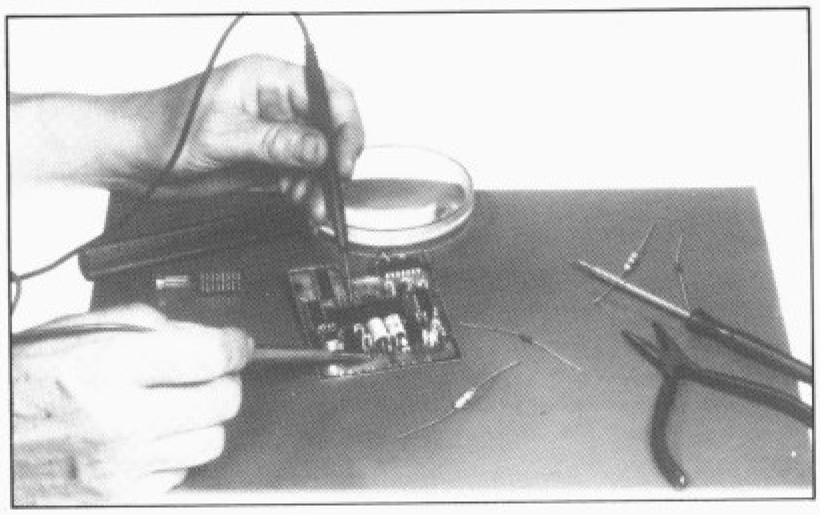
Name ....

Address ....

My phrase is: ....

News desk

If you have any new products for the Dragon — software or hardware — ring the News Desk on 01-437 4343



Non slip mat

TRADITIONALLY, you want to slip, you step on a mat. It's the next best thing to a banana skin. The Stopslip mat has put a stop to all that. Stopslip is for the table or the worktop and has 'the answer to all those slippery problems that can occur in the workshop, lab, office and home', even, who knows? the skiddy carpet, if you use it inventively.

Stopslip is made of an inherently tacky material which holds objects placed on it, according to our reports, as if glued, without leaving any residue on the objects or the table. The tackiness can be restored when flagging by washing the mat in warm soapy water to remove dust and debris. It can be supplied in various sizes, in thickness of 2 or 3mm, and can be cut to size with ordinary scissors.

Call the suppliers, Cobonic Ltd., 32, Ludlow Road., Guildford, Surrey GU2 5NW, on (0483) 505260 for more information and prices.

Bargains for the brave

Proops Distributors Ltd. have a number of working and non-working Dragon 32 units at knockdown prices.

Said Mr. Borrow at Proops: 'We have 30 working Dragon 32s, complete with the power pack, which we are offering for £23, each, and 60 non-working units with minor faults and no power pack, which we are offering for £15 each. We have had to remove the top-cover from all the machines to avoid copyright problems, because they are all out of warranty — there are no guarantees available. Because of this, we really want to sell them to personal callers only, so that they can see what they're getting and have the situation explained to them.

'If someone is really keen and can't get along to us, they can ring up and enquire. We also have 10,000 square feet of electronic surplus stuff here, if people want an incentive to come by.'

Proops Distributors Ltd. are at the Haybridge Estate, Castle Road, Camden Town, London NW1 (one tube stop up from Euston Station on the Northern Line) and the phone number is (01) 267 6911



Free Dragon Cards

Elcan Electronics have been clearing our their grannie's special cupboard and have discovered a hoarded bundle of Nanos Systems Corp. reference cards for the Dragon 32. These handsome, fold-out 10-leaf cards, woth £3.95 each, contain ready reference information for system commands, BASIC characters, statements and special keyboard keys, instructions for simple graphics and music, BASIC internal codes, memory map, hex listings and special tips, printed in black and white and spot colour on white with a red surround.

One of these cards can be yours, if you are among the first 300 Dragon User subscribers to send a large SAE (A5 size is best), enclosing a DU address label with your subscriber number on it as proof of identity (the number will be just above your name on your address label), to Dragon Card Offer, Elcan Electronics, 11 Bury New Road, Preswich, Manchester M25 8JZ.

Trojan disk

PAMCOMMS Ltd. has converted the software supplied with the Trojan lightpen, to run from DragonDOS on disk. The conversion is supplied on disk, with an assembler source file, and costs £3 all inclusive from the company's High Wycombe address.

On special offer from Pamcomms are some copies of the Smeed and Somerville book *Inside the Dragon*, for £3 (£4 overseas). This, they tell us, is the publisher's final possible reduction, so if you want *Inside the Dragon*, don't wait any longer.

Pamcomms, 21, Wycombe Lane, Wooburn Green, High Wycombe, Bucks HP10 0HD.

July shortage

BECAUSE of the dramatic response to Dragon User's subscriptions offer, some people will find that their subs are starting in August. The reason is simple: we have run out of July issues, so there won't be any available as back issues.

To help out readers who have been building up a collection of DUs, we will photocopy any **two** articles from July 1986 for the price we normally charge for **one** (£1, irrespective of length). We are unable to photocopy whole issues.


DRAGON USER
Contents
Editorial

The main articles in July's issue were:

Canoe: a long machine code game.

Disc Drives: basic advice on choosing a disk drive.

Journey Planner: holiday motoring plan in Basic.

Extra graphics: for the Touchmaster tablet.

Plus adventure trail, Dragonsoft (Aquanaut 471, The Vortex Factor, Rommel 3-D), Arcade Arena, Dragon Answers Competition (April winners).

The Machine Code series, fortuitously, did not appear in the July issue.

Please allow plenty of time for delivering photocopies, as we have to fit the copying in around everything else — if there is a rush, this could take several weeks.

Missing Persons

AFTER a disastrous explosion in the Dragon User address box, we have lost touch with writer Geoff Ettridge and August People's Chart winner Jason Lee. Please write and let us know where you are.

Communication

Send in your questions, requests, and pleas to Communication, Dragon User, 12-13 Little Newport Street, London WC2.

Problem Can anyone recommend some good adventure games for the Tandy Colour Computer?
Enquirer P Marlow, 50 Lime Avenue, Bentley, Walsall, West Midlands, WS2 0JP.

Problem Am looking for a screen dump for the Dragon 32 to output to a Microline 80 Printer. Also, are there any other users nearby for a monthly chat or meeting?
Enquirer R J Rolph, 69 Knaves Hill, Linslade, Leighton Buzzard, Bedfordshire, LU7 7SE.

Problem As I now use my Dragon 32 as a word processor, can anyone tell me if I can obtain a good word processing program in cartridge form, as I do not have a disc drive and loading a tape version is time consuming.
Enquirer C Madrell, 28 Sledwick Road, Cleveland, TS23 3HU.

Problem: Can anyone help in converting the Gratext program (June 86) for the CoCo 32K. Also, anyone wanting to swap tips, games, etc.
Enquirer: Robert Jones, 14 Tan-y-Foel, Llanymynech, Powys SY22 6EP.

Problem: Could someone please let me know the secret of how the various numbers for the pokes are obtained.
Enquirer: Alan Finch, 326 Ipswich Road, Colchester, Essex CO4 4ET.

Problem: I need an organ for my Dragon 32, machine code, able to play at least four notes at once and with a reasonable octave range.
Enquirer: Gareth Edwards, 10 Harlech Court, Hendredenry, Caerphilly, Mid Glam CF8 2TR.

Problem: I am a Dragon owner looking for contact with Dragon owners in the Widnes/Runcorn area. I have many games.
Enquirer: Jason Dooley, 90 Derry Road, Widnes, Cheshire WA8 9LQ.

Problem Could you supply me with names and addresses of OS-9 suppliers in the UK (maybe even in Holland?) but not necessarily the Dragon Data Professional Software as I have all I need from this selection. What I am looking for are professional software packages such as window managers, engineering/CAD packages and data comms software. Secondly, can you supply the address of the UK or an international OS-9 users' group, or anyone with a pool of software, newsletters, or other information on OS-9?
Name Robert D. Scholfield
Address Sint Gerlachstraat 45, 5643 NK Eindhoven, Netherlands.

Communication

Stuck for a routine? Need some obscure equipment? Feeling cut off? Fear not — someone, somewhere can help you! Write down your problem on the coupon below (make it as brief and legible as possible) together with your name and address and send it to Communication, Dragon User, 12/13 Little Newport Street, London WC2H 7PP. We'll publish it as soon as we can — meanwhile, maybe there's someone you can help this month!

Problem ....
....
....
Name ....
Address ....
....

Classified

DISPLAY ENHANCER for monitor or T.V. eradicates dot crawl and shimmer. Simple internal modification taking under 30 minutes. Dramatically improves 32/64 display. Full details, only £1. RAPIDVAC, 15 Macaulay Street, Grimsby, DN31 2DS.

DRAGONDOS EPROMS reprogrammed with latest corrections (£6.000), self programming details (£1.50). DOSplus replacement EPROM with many extra features (keyboard repeat &c) (£15.00) information (SAE) (UK only). P.G. Scott, 4 Badgerwood Drive, Frimley, Camberley, Surrey GU16 5UF.

70k ADVENTURE GAME for Dragon 32 "The Curse of the Red Herring". £3.50 to Patrick Martin, The Vicarage, Tregare, Raglan, Gwent NP5 2LH.

POKES for some games, for information 0215 651174 after four o'clock.

COLOSSAL CAVE with game save on cassette £6.00. Cowan Software, 23 Bristol Avenue, Manchester 193NV.

WANTED Manuals for OS9 operating system and stylograph. 0745 32400.

D32 for sale includes software, books and joystick, V.G.C. £75. Phone 0761 62631.

DRAGON WRITER write you own adventures, £8.00 on cassette. Cowan Software, 23 Bristol Avenue, Manchester 193NU.

****USED CHEAP SOFTWARE**** from 50p, business, games, etc., cartridge or cassette. Send for list Adrian Throup, Parkwood House, Parkwood Street, Keighley, BD21 4JP. Tel: after 5pm. 0535 607321.

DRAGON 32 rarely used, two games, some books, tape recorder, £75. No better bargain. Hurry up. Call Maher 01-908 5108.

FLEX. The Curse of Camarc. A classical style text adventure on FLEX disc. Over 100 atmospheric locations and over 20 dynamic characters. 47k of machine code with 10k used from disc with Save/Load to disc etc. Price £10 inc p&p K. Hunter, 46 Greenhill Road, Elton, Bury, Lancs BL8 2LL.

DRAGON 64 disk drive various games, utilities, telewriter, Rainbow writer, Salamander, D.R.S. £250. (0278) 787478.

Dragonsoft

New software for review should be sent to *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP.

Too much play!

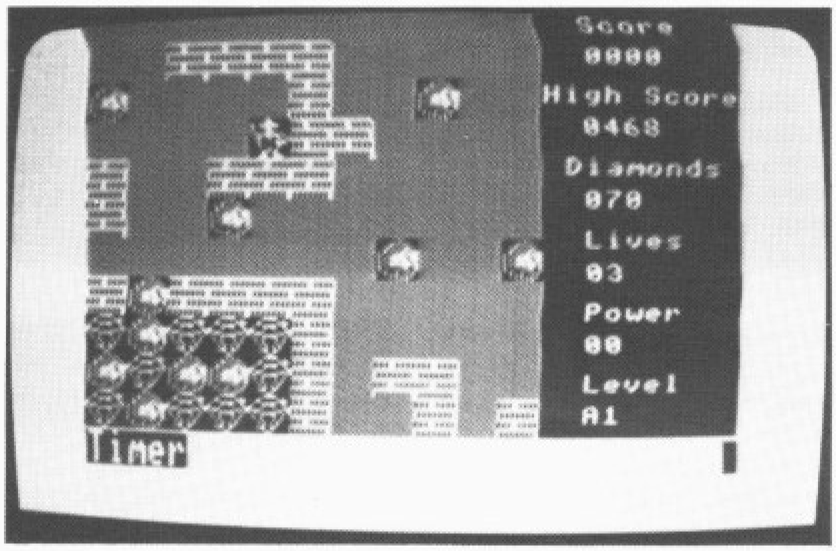
Program: *Boulder Crash*
Supplier: Blaby
Price: £5.00

Dear Helen Armstrong (Dragon User),

I'm afraid I must write in apology for not getting all my copy in on time this month. But, you have to understand, it's not my fault. You see, one of the games you sent me namely 'Boulder Crash' by Blaby is so good that I haven't been able to stop playing it since I got it!!

It's really quite unfair of you to send me a game which is so good that I spend so much time playing it I don't get around to reviewing it.

For your information it's a multi screen game which involves running around collecting gems. Yah, I know what you're thinking. He's hooked on another Manic Miner Clone, but Helen, believe me. It's much more serious than that. Each screen on this takes up about twelve telly screens, and it scrolls as you move.



The first few screens seemed pretty easy, just had to drop the boulders out of the way so that I could get to the gems, making sure nothing fell on my head, get the gems, and go to the exit, but then later on I came across screens with no gems and realised that the only way to get them was by dropping boulders on the monsters and that each time I hit a monster it turned into nine gems.

Then, there was the matter barrier, and the slime, oh God, the slime! I have blisters on my fingers from using 'Z', 'X', '<', and '>' to move the superb graphic man around the screen. My eyes are sore from staring at the screen until late. My phone bill has dropped below three figures, I've spent so much time at the keyboard.

So, apologies once more for not getting the review done. Perhaps you can get something from this letter. Who knows eh?

Yours, *Jason Orbaum*

PS Are we still on for Friday or are you seeing that jerk 'The Expert'?

Forget it, boys. I'm being taken to La Gavroche by a tape cassette wholesaler from Beckenham. Club together and buy yourselves a sandwich — Ed.

Addicted

Program: *The Curse of Camarc*
Medium: FLEX disc only
Price: TBA
Supplier: K. Hunter, 46 Greenhill Rd., Elton, Bury, Lancashire BL8 2LL.

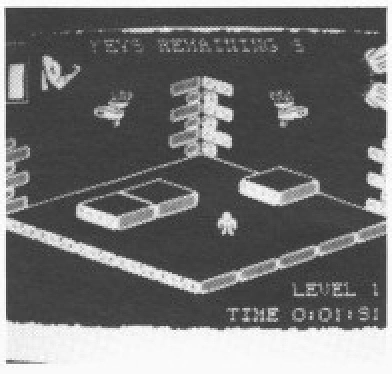
It is comforting to know that no matter what is expected of you, in an adventure, the worst you can do is to fall off your chair, although some adventures become so engrossing that your heart rate suffers at moments like these. Something akin to magic separates the good adventures from the bad. Some of them have such an air of mystery and intrigue about them that you hold your breath before hitting the Enter key, knowing that it may be the last time you are allowed to do so.

The Curse of Camarc has all of these ingredients and more. There is 57k devoted to dynamic characters, bewildering locations and puzzles for you to explore and exploit. Killing the Bear may have been easy but was it the right thing to do? Maybe he could have helped you in your quest to save the Kingdom of Ballakin against the evil of the Wizard Camarc. That I am afraid is for you alone to find out.

Having spent many hours desperately trying to see as much of this adventure as I could before I reviewed it I must admit to being addicted. My highest score is only 35% and I feel as if I have spent a lifetime on it already. There are many things which are not obvious at first glance; it pays, as in all adventures, to be meticulously careful in examining your surroundings. Objects which seem to have served their purpose and have been discarded are sadly missed after travelling over mountains and rivers. It pays to know a little about legendary events as some of them have rubbed off in certain places. The program allows a full SAVE/LOAD facility which is useful, especially just before you try something that may (or may not!) seem risky. FLEX commands may also be accessed in mid-game provided that they only occupy the Utility Command Space ($C100-$C6FF). It is a shame really that this game is only available to us FLEX users, but the sheer size of the program prohibits it from being cassette based.

It is difficult to give a fair appraisal of an adventure game without describing the events which take place in it, but that might spoil the game. Quite simply this is an un-usually large and complex program which I found rivetting and I don't see why you shouldn't as well.

Roy Coates



Monster shortage

Program: *Temple of Doom*
Supplier: Blaby
Price: £5.00

Ha ha ha! I've got one up on The Expert!! He said that Blaby had released a game 'similar to *Atic-Atak*'. Well, he was referring to *Temple of Doom* and he was WRONG!! The game is nothing like Atic-Atak. Indeed it's more like *Knight Lore!*

Right, now that I've had my gloat, on to the game itself. It's a 3-D 'arcade game' which basically involves running round a three dimensional maze collecting food and keys before strength, and thus the very ebb of life itself, run out.

The graphics are very nice, bearing a slight similarity to *The Sword and the Sorcerer*, in terms of iconography (is that a word?). However, it suffers a similar fault to the sword and the sorcerer — it's boring!

The screen jumps whenever something is eaten, or a new room is entered but after a while this becomes almost bearable.

I really have very little else to say. This stinks of a game that's only half way there. It's as if the programmers saying 'This is what I've done so far, but I've got to get rid of that really annoying flicker, and I also have to put the monsters in.'

Yeah, where are the monsters, Blaby?

Blaby are amongst my favourite Dragon software houses. They're charming, great fun, and they know when they've put on a duffer. I think they knew what this review was going to be like. If not, sorry lads, but my mate finished up to level four on his first go!!

Jason Orbaum

Counties Quiz

J Hewitt takes a topographical around the UK and Ireland.

THIS PROGRAM tests you on your knowledge of the map of the United Kingdom and Ireland. The program has four tunes (to congratulate or commiserate), a redefined character set, a true scale map of the British Isles covering more than one PMODE 4 screen, computer-style graphic digits, questions that are not repeated during a game, scoring and percentage facilities, and ratings on your expertise (or otherwise).

First type in the program and then 'RUN'. It will ask for the number of questions you wish to be asked. Enter two digits and press 'ENTER'. If you make a mistake you can only press the backspace after typing *both* digits. You must have more than 10 questions in any one game, to allow an accurate rating.

After a short wait the British Isles will be displayed. If the county in question is to the north of the map (essentially Scotland), you will see the top four-fifths of the map. Similarly the same is true for the southern part of the map. This is because the map takes up five graphic pages and only four can be displayed at a time. The program will draw and fill a county, apart from some of the islands which have boxes round them. You then have to name the county.

Each county is represented by a three-letter code, which is normally the first three letters of the name. See accompanying table for complete list of codes. Type in THREE letters and press 'ENTER', and as before, if you make a mistake you can press backspace when you have entered all three characters, this deletes them all.

Only the regions not counties are shown on the map of Scotland.

Your score, and percentage, will be updated, you will be prompted to press a key, and then another county will be shown until all your questions have been asked. Press 'Y' for another game.

If all the typing seems too much then an enhanced version, with auto run, can be obtained for £2.00 from Mr J. Hewitt, 25 Hammonds Croft, Church Meadow, Hixon, Staffs ST18 0PQ.

Table of Counties

1.	Anglesey	—ANG
2.	Avon	—AVO
3.	Bedford	—BED
4.	Berkshire	—BER
5.	Borders	—BOR
6.	Buckingham	—BUC
7.	Cambridge	—CAM
8.	Carlow	—CAR
9.	Cavan	—CAV
10.	Central	—CEN
11.	Cheshire	—CHE
12.	Clare	—CLA
13.	Cleveland	—CLE
14.	Clywd	—CLW
15.	Cork	—COK
16.	Cornwall	—COR
17.	Cumbria	—CUM
18.	Derby	—DER
19.	Devon	—DEV
20.	Donegal	—DON
21.	Dorset	—DOR
22.	Dublin	—DUB
23.	Dumfries and Galloway	—DAG
24.	Durham	—DUR
25.	Dyfed	—DYF
26.	East Sussex	—ESU
27.	Essex	—ESS
28.	FIfe	—FIF
29.	Galway	—GAL
30.	Gloucester	—GLO
31.	Grampian	—GRA
32.	Gwent	—GWE
33.	Gynedd	—GWY
34.	Hampshire	—HAM
35.	Hereford and Worcester	—HAW
36.	Hertford	—HER
37.	Highland	—HIG
38.	Humberside	—HUM
39.	Isle of Man	—IOM
40.	Isle of Wight	—IOW
41.	Kent	—KEN
42.	Kerry	—KER
43.	Kildare	—KIL
44.	Kilkenny	—KIK
45.	Lancashire	—LAN
46.	Laoghis	—LAO
47.	Leicester	—LEI
48.	Leitrim	—LET
49.	Limerick	—LIM
50.	Lincoln	—LIN
51.	London	—LON
52.	Longford	—LOG
53.	Lothian	—LOT
54.	Louth	—LOU
55.	Manchester	—MAN
56.	Mayo	—MAY
57.	Meath	—MEA
58.	Merseyside	—MER
59.	Mid Glamorgan	—MGL
60.	Monaghan	—MON
61.	Norfolk	—NOF
62.	North Yorkshire	—NYO
63.	Northampton	—NOR
64.	Northumberland	—NUM
65.	Nottingham	—NOT
66.	Offlay	—OFF
67.	Orkney Is	—ORK
68.	Outer Hebrides	—OHE
69.	Oxford	—OXF
70.	Powys	—POW
71.	Roscommon	—ROS
72.	Salop	—SAL
73.	Shetland Is	—SHE
74.	Sligo	—SLI
75.	Somerset	—SOM
76.	South Glamorgan	—SGL
77.	South Yorkshire	—SYO
78.	Stafford	—STA
79.	Strathcylde	—STR
80.	Suffolk	—SUF
81.	Surrey	—SUR
82.	Tayside	—TAY
83.	Tipperary	—TIP
84.	Tyne and Wear	—TAW
85.	Ulster	—ULS
86.	Warwick	—WAR
87.	Waterford	—WAT
88.	West Glamorgan	—WGL
89.	Westmeath	—WME
90.	West Midlands	—WMI
91.	West Sussex	—WSU
92.	West Yorkshire	—WYO
93.	Wexford	—WEX
94.	Wicklow	—WIC
95.	Wiltshire	—WIL

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10 R=RND(-TIMER)
20 PCLEAR5:CLEAR 400,32744
30 FOR I=0 TO 21:READ A$:POKE 32745+I,VAL("&H"+A$):NEXT
40 DATA BD,8B,27,DD,2B,9E,19,BD,84,03,25,05,30,1F,9F,33,39,C6,0E,7E,83,44
50 DEF USR0=32745
60 DIM A(1),B(1),C(1),D(1),E(1),F(1),G(1),H(1),I(1),J(1),K(1),L(1),M(1),N(1),O(1),P(1),Q(1),R(1),S(1),T(1),U(1),V(1),
   W(1),X(1),Y(1),Z(1),ZE(1),UN(1),TW(1),TH(1),FO(1),FI(1),SI(1),SE(1),EI(1),NI(1),OU(1)
70 CLS0:PRINT@234,"please";CHR$(128);"wait";:SCREEN0,1
80 PMODE4,1:PCLS
90 FOR I=0 TO 26:FOR J=0 TO 7
100 READ A
110 POKE 1536+I+(J*32),A
120 NEXT J,I
130 FOR I=0 TO 9:FOR J=0 TO 7:READ A:POKE 1792+I+(J*32),A:NEXT J,I
140 GET(0,0)-(7,7),A,G
150 GET(8,0)-(15,7),B,G
160 GET(16,0)-(23,7),C,G
170 GET(24,0)-(31,7),D,G
180 GET(32,0)-(39,7),E,G
190 GET(40,0)-(47,7),F,G
200 GET(48,0)-(55,7),G,G
210 GET(56,0)-(63,7),H,G
220 GET(64,0)-(71,7),I,G
230 GET(72,0)-(79,7),J,G
240 GET(80,0)-(87,7),K,G
250 GET(88,0)-(95,7),L,G
260 GET(96,0)-(103,7),M,G
270 GET(104,0)-(111,7),N,G
280 GET(112,0)-(119,7),O,G
290 GET(120,0)-(127,7),P,G
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300 GET(128,0)-(135,7),Q,G
310 GET(136,0)-(143,7),R,G
320 GET(144,0)-(151,7),S,G
330 GET(152,0)-(159,7),T,G
340 GET(160,0)-(167,7),U,G
350 GET(168,0)-(175,7),V,G
360 GET(176,0)-(183,7),W,G
370 GET(184,0)-(191,7),X,G
380 GET(192,0)-(199,7),Y,G
390 GET(200,0)-(207,7),Z,G
400 GET(208,0)-(215,7),QU,G
410 GET(0,8)-(7,15),ZE,G
420 GET(8,8)-(15,15),UN,G
430 GET(16,8)-(23,15),TW,G
440 GET(24,8)-(31,15),TH,G
450 GET(32,8)-(39,15),FO,G
460 GET(40,8)-(47,15),FI,G
470 GET(48,8)-(55,15),SI,G
480 GET(56,8)-(63,15),SE,G
490 GET(64,8)-(71,15),EI,G

500 GET(72,8)-(79,15),NI,G
510 FOR I=0 TO 10:READ ST$(I):NEXT
520 PMODE4,1:PCLS:SCREEN1,1
530 A$="COUNTIES QUIZ BY JUSTIN HEWITT,           JUNE 1986":X=30:Y=10:GOSUB 2930
540 PLAY"L4V31T6O3EEFGGFEDCCDEEDL2DL4EEFGGFEDCCDEDCL2CL4DDECEL8EFL4ECDL8EFL4EDCDL2O2GO3L4EEFGGFEDCCDEDCL2CL4"
550 A$="DO YOU KNOW YOUR COUNTIES ?,,CAN YOU TELL BUCKINGHAM BERKSHIRE AND.,BEDFORD APART ?,,THIS PROGRAM WILL
    TEACH YOU TO RECOGNISE,,ALL THE COUNTIES IN ENGLAND SCOTLAND,,IRELAND AND WALES,,CAN YOU BECOME A COUNTY CHAMPION ?"
    :X=6:Y=40:GOSUB 2930
560 A$="HOW MANY QUESTIONS ? FROM 10 TO 95":X=6:Y=170:GOSUB 2930
570 QS$="":X=230:Y=170:COLOR0,0
580 LINE(230,170)-(250,180),PSET,BF
590 FOR I=1 TO 2
600 IP$=INKEY$:IF IP$="" THEN 600
610 IF IP$<"0" OR IP$>"9" THEN GOTO 600
620 A$=IP$:GOSUB 2930
630 PLAY"T25O2B"
640 QS$=QS$+IP$
650 NEXT I
660 IP$=INKEY$:IF IP$="" THEN 660
670 IF IP$=CHR$(8) THEN GOTO 570
680 IF IP$<>CHR$(13) THEN GOTO 660
690 QS=VAL(QS$):IF QS<10 OR QS>95 THEN GOTO 570
700 SCREEN0,1
710 PMODE4.1:PCLS:PMODE4.2:PCLS
720 DRAW"C5S4:BM100.190:R0RENRFRUHU2ER2UER3ERFRULUEF2DR2EFDRFUE3HU3ER2ERE2R3FDFR9U2ER3ER2BF2U0UR3FLG2LH2R4GLBU4BL2U0UR2FR4FDR2UER2ER6DFR2
ERE2RE2FREUE3REU3ERHL3GL2G2H2ER2L2HGUL3U2R3ER3UEL3HERE2FRUE2U2EREU5ERU7HLH4"
730 DRAW"L3HLGHL3G2D3L4U2L2U2R3U2RU4HU2H2UEL4HL2HL2HER5F2RULU2HUHUHU3LH2UHUH2UH2LHDGH2UHUHUHUHU5HU2HEH2UH2ULHUH2LHLH2L2GLG2L7H2EFR5EUER3E
2ULH2L3HER3ER2UEUEUE3U2EU3LHER2UE2U5HLHL2GL3HLGL4HLGL2GLLDGLHELHER2EUHLHEREU2E2REL2R0R0"
740 DRAW"RD2GLF4DGHULHGHD2GHNDLDBL13L0L2U2U2EU2HUHUBR8D0D3RLGDLU3HGD4GD2BL4BD2D0DGFHLHUFEDBD4BL1L0BD2D0DRBLBD2D0DGDGDGBR10BU12R0ER2E2UDFD2F
EGFGFRFRFGL2HL2HL2UEHLGUHBR13BU6G0G"
750 DRAW"DFGD4EFDFGDFGLLDFGLDFDDGL4DFRFDREFRU2E2REFDGDG2D2GHGD2FGFGDFDL2DR2DLDDEU4E2FD4F2UEFDFD2F3DG2D2G2DFGD3GHUHD3RD2FDFUHU2R3FRFRUEFR4
ER3EUER4DGLGD2GD3GDFD3F2RFDER2EFD2G3D10F2R3FGL5HRD2L2UL3GHL3G2LG7LGDFER2UERUERF2G2F2GLDF2G"
760 DRAW"D2GDG2LGLGLG2L3G3LDR2FGDFDFR2EUER3FR2FGLFR3EF3RFDR4E3R2E2RUE5FG3DGDGLGLGD2FG2L6HL2GHL3GLFDGLGLGD3GL6D2GLD2GLG2L3D3REFRF"
770 DRAW"BM94,32R0RDGUBM89,34U0RBM90,37U0ERBM87,41R0R2DLGUBM82,44D0DR2GDHLBM91,43D0FRDFRFDGL2G2NULNUHUR3EHLEULULBM93,46D0DR2DL2BM90,54R0R
D24BM95,55R0RDL2DRDL2DRDLBM89,59R0RDL3D3FU3R3FL2DR2GL"
780 DRAW"BM100,61;D0DLGR2GL2DR2DL2DRDLGR2GL2DR3BM102,63D0DRDLDRFL2FRBM111,92R0RDLDR2DL2DLGR2DL3DR2BM110.114R0R2FL4DR4FRL6DR5GL3DR2G"790 D
RAW"BM98,92U0U4HLGHUEU3H3U3H2L3G2H2L2GDGLHUEREULH2ULD2GD4GHU3HL3GL2G4D2FGLDGLD2R4FDG2LGLD2GL5GHL2HL2HGLG2LDF2DGHLD2FR3FG2D2GLGLFGFDERFDER
FGLDR2UR2FR2UHUHLHER2FDRFD2F2DGL4GD2GDGLG6UR2UR4FGL3DGL2FGFGL4HG2DGRER5FG2L4DGD2EFGFELR5FGLG2DRU2RFRE2F2GLG"
800 DRAW"L2RFGREFR3ERER2FRER2E2U2EFR2ER2E2RE4R5EFR4EU2HERE2UEU2EHEU8HUH2E2U5HU5ER2E4UER2UHU3E"
810 PAINT(110,10),5,5
820 PAINT(68,124),5,5
830 PAINT(90,21),5,5
840 PSET(83,15,5):PSET(83,16,5)
850 PSET(88,32,5)
860 PMODE4,1
870 DRAW"BM82,55;C5R0RFE2UE2RERFGDGDBR13R0REU2EU2HUR4F2EFERDFE2R2ER3ER3FG2D3G3BM128,33;D0D4F2R2GL2UL2ELU4LD2LDBM125,
    40D0D2RDBM130,42D0DLBM129,31L0RDBM152,19U0U4EU2HGLUHR2NDREHU3HGDRNURFEDFNL2FNL2RDL4DRDRDLDRGLDRGD"
880 DRAW"BM154,2R0RD2RNU2DBM158,1D0DRU"
890 PSET(130,34,5):PSET(130,36,5):PSET(132,33,5):PSET(132,35,5):PSET(158,4,5)
900 PAINT(88,54),5,5:PAINT(118,54),5,5
910 PMODE4,2:A$="WHAT PLACE,IS THIS ?":X=170:Y=11:GOSUB 2930
920 SC=0:OO=0:A$="SCORE":X=5:Y=11:GOSUB 2930
930 A$=" 0 OUT,OF  0":X=5:Y=20:GOSUB 2930
940 A$="PERCENTAGE":X=5:Y=47:GOSUB 2930
950 A$="  0":X=22:Y=56:GOSUB 2930
960 P1$="O1T3CGFEDC":P2$="O4T10CGFEDDEFGC"
970 FOR I=128 TO 128+94
980 QU$=QU$+CHR$(I)
990 NEXTI
1000 FOR I=1 TO LEN(QU$)
1010 SW=RND(LEN(QU$)):MI$=MID$(QU$,SW,1):MID$(QU$,SW,1)=MID$(QU$,I,1):MID$(QU$,I,1)=MI$
1020 NEXT I
1030 QU$=LEFT$(QU$,QS)
1040 FOR LO=1 TO LEN(QU$)
1050 RR=ASC(MID$(QU$,LO,1))-127
1060 RR=(RR*10)+1970
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1070 XX=USR0(RR)
1080 READ NA$,CO$,MO,PX,PY,DR$.
1090 PMODE4,MO:SCREEN1,1
1100 IF PX<>0 THEN DRAW"C0"+DR$:PAINT(PX,PY),0,0:ELSE DRAW "C5"+DR$+"C0"
1110 EX=(MO-1)*48
1120 A$=INKEY$:SOUND 200,1
1130 PL$="":X=170:Y=77-EX
1140 FOR I=1 TO 3
1150 IP$=INKEY$:IF IP$="" THEN 1150
1160 IF IP$<"A" OR IP$>"Z" THEN GOTO 1150
1170 PLAY"T2502B"
1180 A$=IP$:GOSUB 2930
1190 PL$=PL$+IP$
1200 NEXT I
1210 A$=INKEY$:IF A$="" THEN 1210
1220 IF A$=CHR$(8) THEN LINE(168,76-EX)-(192,86-EX),PSET,BF:GOTO 1120
1230 IF A$<>CHR$(13) THEN 1210
1240 IF PL$=CO$ THEN A$="CORRECT":PLAY P2$:SC=SC+1:ELSE A$="WRONG IT WAS,"+NA$:PLAY P1$
1250 OO=OO+1
1260 X=170:Y=86-EX:GOSUB 2930
1270 LINE(4,69-EX)-(50,87-EX),PSET,BF
1280 LINE(20,105-EX)-(44,115-EX),PSET,BF
1290 S$=STR$(SC):S$=RIGHT$(S$,2)::O$=STR$(OO):O$=RIGHT$(O$,2):A$=S$+" OUT,OF "+O$:X=5:Y=68-EX:GOSUB 2930
1300 P=INT((SC/OO)*100):A$=RIGHT$(STR$(P),3):X=22:Y=104-EX:GOSUB 2930
1310 A$="PLEASE PRESS, ANY KEY":X=170:Y=122-EX:GOSUB 2930
1320 A$=INKEY$
1330 A$=INKEY$:IF A$="" THEN 1330
1340 IF PX<>0 THEN PAINT(PX,PY),5,5:ELSE DRAW"C0"+DR$
1350 IF CO$="STR" OR CO$="HIG" THEN DRAW"C5"+DR$
1360 COLOR 0,0
1370 LINE(168,78-EX)-(255,139-EX),PSET,BF
1380 NEXT LO
1390 PMODE4,1:SCREEN1,1:PCLS
1400 A$="COUNTIES QUIZ":X=85:Y=10:GOSUB 2930
1410 PLAY"T10V31O3L2GL4EL2.AL2GL4EL2.AL4GECO2BO3L4.CL8O2AO3L2FL4EL2.DL2AL4FL2.BL2AL4FL2.BL4AFDL2CL4O2BO3L2AL4A-L2GP4O4L2.
     CO3AL2BL8GAL2.B-L4AAACL4.DL8FL2.A-L4AGFL2GL4EL2.AL4ABO4C#DEFL2.EL2GL4EL2.CC"
1420 S$=STR$(SC):P=INT((SC/LEN(QU$))*100):P$=STR$(P):M$=STR$(LEN(QU$)):R$=ST$(INT(P/10))
1430 A$="YOU GOT"+S$+" OUT OF A MAXIMUM OF"+M$+",,THIS MEANS YOU GOT A PERCENTAGE OF"+P$+",,YOUR RATING IN THIS GAME IS
     "+R$:X=6:Y=40:GOS UB 2930
1440 A$="WOULD YOU LIKE ANOTHER GO ?":X=6:Y=130:GOSUB 2930
1450 IP$=INKEY$
1460 IP$=INKEY$:IF IP$="" THEN 1460
1470 IF IP$="Y" THEN GOTO 560
1480 IF IP$<>"N" THEN GOTO 1460
1490 CLS:END
1500 DATA 0,14,27,27,31,27,27,27
1510 DATA 0,30,27,27,30,27,27,30
1520 DATA 0,14,27,24,24,24,27,14
1530 DATA 0,30,27,27,27,27,27,30
1540 DATA 0,31,24,31,31,24,31,31
1550 DATA 0,31,24,31,31,24,24,24
1560 DATA 0,14,27,24,27,27,27,14
1570 DATA 0,27,27,27,31,27,27,27
1580 DATA 0,15,15,6,6,6,15,15
1590 DATA 0,3,3,3,27,27,27,14
1600 DATA 0,27,27,27,30,27,27,27
1610 DATA 0,24,24,24,24,24,31,31
1620 DATA 0,99,119,127,107,99,99,99
1630 DATA 0,51,59,63,55,51,51,51
1640 DATA 0,14,27,27,27,27,27,14
1650 DATA 0,30,27,27,30,24,24,24
1660 DATA 0,14,27,27,27,27,26,15
1670 DATA 0,30,27,27,30,27,27,27
1680 DATA 0,14,27,24,7,3,27,14
1690 DATA 0,63,63;12,12,12,12,12
1700 DATA 0,27,27,27,27,27,27,14
1710 DATA 0,27,27,27,27,14,14,4
1720 DATA 0,99,99,99,107,127,119,99
1730 DATA 0,27,27,27,14,27,27,27
1740 DATA 0,27,27,27,14,14,14,14
1750 DATA 0,31,27,3,14,24,27,31
1760 DATA 0,12,51,3,12,12,0,12
1770 DATA 0,124,76,84,84,86,102,126
1780 DATA 0,8,8,8,8,24,24,24
1790 DATA 0,126,2,2,126,96,96,126
1800 DATA 0,124,4,4,126,6,6,126
1810 DATA 0.96.98.98.98.126.2.2
1820 DATA 0,124,64,64,126,6,6,126
1830 DATA 0,62,32,32,126,98,98,126
1840 DATA 0,124,4,4,4,6,6,6
1850 DATA 0,60,36,36,60,102,102,126
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1860 DATA 0,124,68,68,126,6,6,126
1870 DATA "IDIOTIC,,THE PROGRAMMER DID BETTER WITH HIS,,EYES CLOSED"
1880 DATA "IDIOTIC,,HOW COULD YOU GET SO LOW ?"
1890 DATA "TERRIBLE,,YOUR SCORE WAS NOT VERY GOOD WAS IT ?"
1900 DATA "POOR,,BUT I HAVE SEEN WORSE"
1910 DATA "AVERAGE,,NOT GOOD BUT THEN AGAIN NOT TOO BAD"
1920 DATA "AVERAGE,,NOT BAD BUT THEN AGAIN NOT TOO GOOD"
1930 DATA "GOOD,,BUT THERE IS STILL ROOM FOR SOME,,IMPROVEMENTS"
1940 DATA "CLEVER,,YOU ARE STARTING TO KNOW YOUR COUNTIES,,QUITE WELL"
1950 DATA "BRAINY,,YOU CERTAINLY KNOW YOUR COUNTIES"
1960 DATA "BRILLIANT.,I AM SURE YOU HAVE BEEN PRACTISING"
1970 DATA "ASTOUNDING,,A PERFECT SCORE,,YOU HAVE NOW BECOME A COUNTY CHAMPION"
1980 DATA CORNWALL,COR,2,105,183,"BM100,188;F0FEU2E2RE2R3ERNFEU3H2EUHGLG4D2G2DG2LG2L2DEFRF"
1990 DATA DEVON,DEV,2,120,164,"BM113,180U0U3H2EUHEU3RERE2U2R3FGFR2F3RFRFR2FNRL2G2LGL2G2D3FG2LH2GLH3"
2000 DATA SOMERSET,SOM,2,135,163,"BM121,164G0GFR2F3RFRFR2ERERERE2UEU5HL2HL2GLD2FG3L6HL2"
2010 DATA DORSET,DOR,2,141,173,"BM132,171E0ERERERE2R6FD5LG2DL8UH2L"
2020 DATA HAMPSHIRE,HAM,2,155,163,"BM147,172U0U4ERE2U4E2R5F2DFDFGD3LGL4HL2GDLGL2"
2030 DATA WILTSHIRE,WIL,2,147,158,"BM140,164EU5HEUEUE2R4ERFD2FD5GD4G2L2HL5"
2040 DATA WEST SUSSEX,WSU,2,165,168,"BM161,169U0U3E2R7FDGD2L4GL2G2HU"
2050 DATA EAST SUSSEX,ESU,2,175,168,"BM171,164R0R6F2RFGLG2LGL2H2LU2EU2"
2060 DATA SURREY,SUR,2,165,160,"BM159,159E0E2RE2FR2F2RFD4GL8H2UH"
2070 DATA BERKSHIRE,BER,2,155,158,"BM153,159R0R6E2RE2UHL4GL2H2LG2FD3"
2080 DATA KENT,KEN,2,180,160,"BM171,163U0U4E4RDFR4FR2FR2ER2GD3LG4DLHGHLH2L5"
2090 DATA ESSEX,ESS,2,175,148,"BM173,144R0R6FR3FR3GHG2LG2D2NR3DL4D2LUH2EUHU2HU"
2100 DATA AVON,AVO,2,139,154,"BM138,158R0R2EUEU2H2GDGDGD"
2110 DATA HERTFORD,HER,2,170,148,"BM169,144R0R2FDFD2FDGHL3GHUH2NRURFEU2"
2120 DATA BUCKINGHAM,BUC,2,162,148,"BM160,153R0R3FEREU2H3U6HL2GDG2D2FD5"
2130 DATA OXFORD,OXF,2,155,148,"BM154,141F0FD2FRF2D6GL2H2LGHUHU3HE2REU"
2140 DATA GLOUCESTER,GLO,2,145,148,"BM149,144D0D2FD3G2L4GLH2E2H2G4HU2E3RER5ER2"
2150 DATA SUFFOLK,SUF,2,180,138,"BM176,134R0R3ERFR2FR2E2R3ED2G2D5LG2D2GL3HL3HL4HUEU6"
2160 DATA CAMBRIDGE,CAM,2,170,138,"BM173,128D0D2FD2FD7GDGL4HUHU2H2U2EUHUE2R3ER"
2170 DATA BEDFORD,BED,2,166,144,"BM165,137F0F2D2FD5GHGHU6HEU"
2180 DATA WEST MIDLANDS,WMI,2,145,135,"BM142,133R0R5FR3FGL8GHU2"
2190 DATA NORTHAMPTON,NOR,2,160,138,"BM165,132F0FDGD2GDGL2GDG3LHU2HU2ERER2EUE2R2"
2200 DATA WARWICK,WAR,2,150,138,"BM151,130F0F2DFD7GDGLGH3U2HU2ER4EHLHUE2"
2210 DATA ANGLESEY,ANG,2,111,116,"BM110,115R0R2DFDG2UHU2"
2220 DATA "HEREFORD AND,WORCESTER",HAW,2,135,140,"BM133,136F0FRFR4ERER2FD2FD2G2L5GLG3L3H3U4EU2ER"
2230 DATA NORFOLK,NOF,2,180,128,"BM173,128R0R3EU3ER3FERFR3F4RD4GL3G2L2HL2HLGL4HU2HU"
2240 DATA "THE ISLE,OF MAN",IOM,2,0,0,"BM105,102R0R9U4R3U6L2U3L7D6L3D7"
2250 DATA LEICESTER,LEI,2,157,130,"BM161,125F0FDFDF2DGL2G2DGL2GH2U2HUHUE3RFR2EU"
2260 DATA STAFFORD,STA,2,144,128,"BM144,121R0RFRFD4F3G2DGHL5H2U6E4"
2270 DATA SALOP,SAL,2,135,128,"BM135,123R0R3F2D6F2GD3GL4HLHGL2HU3HE3HU2ER2E2"
2280 DATA LINCOLN,LIN,2,165,118,"BM160,113E0ER2ER2FRERDF2D2FD3GDL2GD2FRD2GL3G2H2UHUH2UEU6H2"
2290 DATA NOTTINGHAM,NOT,2,158,118,"BM157,114R0R2F2D6GD4DL2HU3HU7E"
2300 DATA DERBY,DER,2,150,118,"BM148,113F0FRFRFRFD6FD2G4LH3U4HLH2UEU3ER"
2310 DATA CHESIRE,CHE,2,135,118,"BM136,114E0EFR3FREFD2GD3G3L2HL5HUHU3R4E2U"
2320 DATA "NORTH,YORKSHIRE",NYO,2,150,98,"BM156,88R0R2FDF2DFDF2DLGLGDGD7GLHUHUHLHL5GL5H3U2HU3E2R2EU2HERFRER6ERF"
2330 DATA LANCASHIRE,LAN,2,135,100,"BM134,97R0REFD2FD2F3R3FGDG2L3GLGHL2HLU8E3U"
2340 DATA DURHAM,DUR,2,147,88,"BM140,84R0RERER2EFR2FD3GDGL3GLHLH3U"
2350 DATA MERSEYSIDE,MER,2,133,112,"BM131,110R0RFR2FDL4HU"
2360 DATA MANCHESTER,MAN,2,142,112,"BM139,110R0R3FGDGL2GLHL2HLHER"
2370 DATA CUMBRIA,CUM,2,133,88,"BM132,76R0R2F2D2FRFD4F2D2FD2GL2G2LGLH2GL3HLHU3HUEU3EU2RE2UE2"
2380 DATA "NORTH,UMBERLAND",NUM,2,142,70,"BM141,62R0RF3DFD2FD2FD5GD2GL2GLGLHUHLHU2H2UEU2ERE3U2HUE"
2390 DATA HUMBERSIDE,HUM,2,163,101,"BM163,98R0R2D2FDFDFNDL6G2F2R2FR2FRGLUL3NUGNU2LNU2LNU3GNU5HUHNREU7EUER"
2400 DATA "SOUTH,YORKSHIRE",SYO,2,153,113,"BM157,110R0RFD2GLG2L2HLHLH2ERFRER4"
2410 DATA "THE ISLE,OF WIGHT",IOW,2,155,174,"BM154,174R0R2GL"
2420 DATA "TYNE AND,WEAR",TAW,2,148,81,"BM148,78D0DF2DL2HU2"
2430 DATA CLEVELAND,CLE,2,152,88,"BM151,86R0RF2LGLHU"
2440 DATA "WEST,YORKSHIRE",WYO,2,150,108,"BM147,104R0R5FRFDFDFGL4GLHLHL3HEUE3"
2450 DATA "DUMFRIES AND,GALLOWAY",DAG,1,120,126,"BM118,117R0R3FDFR2ERER2F2D4G3HL4G2DL3GL4HG2HLHL2EU3R2E4R3EU2"
2460 DATA BORDERS,BOR,1,135,116,"BM132,108R0R2ERERFRFD2G2DFD2G3LGD2G2HU3H2L2GLHUHU6ER6"
2470 DATA LOTHIAN,LOT,1,128,108,"BM122,109R0R9ER2ERENRH2L2GLG2L8ULDLFR"
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2480 DATA CENTRAL,CEN,1,115,98,"BM109,95R0RER2FRFRFDF3RFDLULG2FDGLH2L5HLH2U3EU2"
2490 DATA STRATHCLYDE,STR,1,107,91,"BM105,87R0R2ERF2DG2D2GD4GD3F2RFR5F2RFRFRFD6FD2GLHUHL3GD2GL3G4L2EHUE2U2REU2H3U2HUH2GLU
        4H2G2UEHEHU2FE2U 2E2UEUBL13BD5F0F2RDLBG2BLL0LBD10BLG0NGF2DBR3BU5U0BEBUU0BR3BD2D0BRBD5G0GD2BD3BLG0GBR7BU3U0"
2500 DATA TAYSIDE,TAY,1.125.86,"BM121,81D0D2FR7E2RF2DF2GDGDGLGL3G2F2G2DGL4H3UHLHLHL2GLHEU2E2UHER2ERER2E2"
2510 DATA GRAMPIAN.GRA,1.135,76,"BM125,68R0RFR4ERFR3ER2FRD5G2LG2F2D2GD2G2H2UH2LG2L7HU2ER2EREU5L2HU3"
2520 DATA HIGHLAND,HIG.1,110,56,"BM106,48R0R3F2EFEF2E2R2ER3ER3G2D3G4LG3D2LG2F2RDL2G2FDF2R2EURER2D3FRFD4GLGL2G4L2GLGL5GL
        3HGLG3DHGULHLR3E2U 2HE2HRE2HUBL4L0L2UL3EL3EREL3HL2UR2E2D2LDR2BR10BD4H0HUH2U2EHUE4F3E2UHUH2EU3EU2EU2"
2530 DATA GWYNEDD,GWY,2,120,120,"BM121,117D0D2F3ERFDGD2GL2GDGDG2H2E2H2E2H3LG4L2DE8RE2"
2540 DATA CLWYD,CLW.2,128,120."BM121,117D0D2F3ERFDGD2F2REUER2EH2UHU2L3HL2GHL"
2550 DATA POWYS,POW,2,125,140,"BM123,127R0R4FR2FG3FD3FD3GD4FGDG3L5HU9EU3HU2HE2UEU"
2560 DATA DYFED,DYF,2,110,145,"BM119,133F0FD2FD3GD8GLG2LHL2HL3G2DL2UHUEH2E2R3E2RERERE3UEU2"
2570 DATA GWENT,GWE,2,132,150,"BM130,146F0F2R2FDFG4L3HU3HUE2U"
2580 DATA "MID,GLAMORGAN",MGL,2,123,154,"BM123,151R0R4FD3RDL2HG2HLU2EU"
2590 DATA "WEST,GLAMORGAN",WGL,2,120,153,"BM118,150R0R2F2DG2H2LGLEUE"
2600 DATA "THE OUTER,HEBRIDES",OHE,1,0,0,"BM84,47R0R11D11L2D3L2D3L4D3L3D2L2D9L2D8L7U25R5U10R6U4"
2610 DATA "THE,SHETLAND,ISLANDS",SHE,1,0,0,"BM161,0D0D14L2D8L11U7L2U13R3U4"
2620 DATA "THE,ORKNEY,ISLANDS",ORK,1,0.0,"BM124,29R0R10D14L2D2L9ULU12R2U3"
2630 DATA LONDON,LON.2,170,156,"BM164,153R0RERER3F3G4HLH2L2HU"
2640 DATA FIFE,FIF,1,127,100,"BM128,97R0R3F2GL3G2DL4UEREUE"
2650 DATA "SOUTH,GLAMORGAN",SGL,2,125,157,"BM123,157E0E2RFD2L3"
2660 DATA ULSTER.ULS,1,80.132,"BM77,125F0FRE2UR2F2E2R3FD3F3D3GDF2ERG2D3FLG2DG3HL4H2LHU2H2GD2G2L4HLH4U3EREUE2REUE2UE"
2670 DATA DONEGAL,DON,2,68,78,"BM69,73R0R3D3F3DG2DGLG2DGLGHU2H2L3E4HU2E3R3"
2680 DATA MAYO,MAY,2,48,96,"BM45,92F0FR2FR2FR2FGFR2EFDGD2GDG4L2HL3HL3U2E2H2L3NURE2UH2E2R"
2690 DATA SLIGO,SLI,2,61,96,"BM63,89D0D7FRFGLGLHLH2GL2HEHLUR5E2UER"
2700 DATA LEITRIM,LET,2,65,96,"BM64,88R0RFD3F2GDF2RF2DG3U3H4LHU7"
2710 DATA CAVAN,CAV,2.76,100,"BM68,94F0F2RFR4F2R2F2DGLGL2GHLHUHUH2LH2U"
2720 DATA MONAGHAN,MON,2.79,96,"BM79,92F0F2D2FRFD3GH3L2H2E2U2"
2730 DATA LOUTH,LOU,2,86,100,"BM85,99R0R6GL2G2D5HUHU4"
2740 DATA KERRY,KER,2,45,144,"BM47,129F0FD3F3GD6FDGL3GLGLHLH2L6U2ER3E3H2L5EFR4E2HE3R2E"
2750 DATA GALWAY,GAL,2.58,108,"BM60,104R0R2FDFD2FDFD2FD2G4L2HL3GHUHEUH2U2H3UL3G2F2RDFLHLULUL3UNR2L3ENR5UNR6RENR4ER3
        FR3FR2E3R3"
2760 DATA ROSCOMMON,ROS,2.67,103,"BM59,99R0R2FREREF3D3GD3FDFD2FG3HUHU2HUHU2HUHL2GLHUEU2"
2770 DATA LONGFORD.LOG,2,72,104,"BM72,101F0FDF2G2DGL3HU3E3"
2780 DATA WESTMEATH,WME,2,77,108,"BM75,105R0RF2D4G3L4HU2HER2EUE"
2790 DATA MEATH,MEA,2,82,108,"BM82,102R0RFDFDF2D2LG3LHL2HU4HUERER"
2800 DATA DUBLIN,DUB,2,85,114,"BM86,110R0RD3G2F2GLH2U3E2"
2810 DATA KILDARE,KIL,2,81,114,"BM78,111F0FR2F2D2FDGD2GD2GHU2HEHUHEUH2U"
2820 DATA OFFLAY,OFF,2,70,119,"BM76,113R0RF2DG2HLG3DG3HUEU3HE3R4"
2830 DATA CLARE,CLA,2,53,124,"BM49,119R0R4EFDFER3FRFDGD2G2LGL6HGL3H2L2E2RE2UEU"
2840 DATA TIPPERARY,TIP,2,68,128,"BM67,117R0RFD3GDFE2FDGD2F4D5GH2L3GFGL4H2E2UEU2HLH2EU2EU2E3"
2850 DATA LAOGHIS.LAO,2,76,124,"BM75,117R0RFEFDFGFD2FG2L2GHL3HUEU4E2"
2860 DATA CARLOW,CAR,2,80,128,"BM81,125R0RFGD4G2H2U3E3"
2870 DATA WICKLOW,WIC,2,87,124,"BM84,118R0R2EDFD8GL2GLHUEHU3EU2"
2880 DATA CORK,COK,2,58,144,"BM56,134R0R3F2RFDFDFD2FDGL2GL2HG2D2GL2GLHL2GLGL3HRE2HUERER3EUHU6E2R3"
2890 DATA LIMERICK,LIM,2,61,133,"BM51,128F0FR6EREF2RFD2GDG2LH2L3GL3GH3U3ER"
2900 DATA KILKENNY,KIK,2,77,134,"BM73,127R0R2FEFD3FD7L3H2EU5H3"
2910 DATA WEXFORD,WEX,2,82,136,"BM83,129R0RER2FGD2GDGLG2FD2L4U6E3U"
2920 DATA WATERFORD,WAT,2,71,138,"BM69,135R0R3F4RDL5G4L2HU2HUER3EH"
2930 X1=X:FOR A=1 TO LEN(A$)
2940 LE$=MID$(A$,A,1)
2950 IF LE$<="9" AND LE$>="0" THEN AS=ASC(LE$)-46:X=X+2:GOTO 2980
2960 IF LE$="," THEN Y=Y+9:X=X1:GOTO 3030
2970 IF LE$=" " THEN AS=1:ELSE IF LE$="?" THEN AS=38:ELSE AS=ASC(LE$)-53
2980 IF AS=20 OR AS=3 THEN X=X-1:ELSE IF AS=24 OR AS=34 THEN X=X+2:ELSE IF AS=31 OR AS=25 THEN Y=X+1
2990 T=X+7:U=Y+7
3000 ON AS GOSUB 3050,3060,3070,3080,3090,3100,3110,3120,3130,3140,3150,3160,3170,3180,3190,3200,3210,3220,3230,3240,
3250,3260,3270,3280,3290,3300,3310,3320,3330,3340,3350,3360,3370,3380,3390,3400,3410,3420
```

```
3010 IF AS=3 THEN X=X+5:ELSE X=X+6
3020 IF LE$>="0" AND LE$<="9" THEN X=X-1
3030 NEXT
3040 RETURN
3050 RETURN
3060 PUT(X,Y)-(T,U),ZE,OR:RETURN
3070 PUT(X,Y)-(T,U),UN,OR:RETURN
3080 PUT(X.Y)-(T.U).TW.OR:RETURN
[illegible]
3100 PUT(X,Y)-(T,U),FO,OR:RETURN
3110 PUT(X,Y)-(T,U),FI,OR:RETURN
3120 PUT(X,Y)-(T,U),SI,OR:RETURN
3130 PUT(X,Y)-(T,U),SE,OR:RETURN
3140 PUT(X,Y)-(T,U),EI,OR:RETURN
3150 PUT(X,Y)-(T,U),NI,OR:RETURN
3160 PUT(X,Y)-(T,U),A,OR:RETURN
3170 PUT(X,Y)-(T,U),B,OR:RETURN
3180 PUT(X,Y)-(T,U),C,OR:RETURN
3190 PUT(X,Y)-(T,U),D,OR:RETURN
3200 PUT(X,Y)-(T,U),E,OR:RETURN
3210 PUT(X,Y)-(T,U),F,OR:RETURN
3220 PUT(X,Y)-(T,U),G,OR:RETURN
3230 PUT(X,Y)-(T,U),H,OR:RETURN
3240 PUT(X,Y)-(T,U),I,OR:RETURN
3250 PUT(X,Y)-(T,U),J,OR:RETURN
3260 PUT(X,Y)-(T,U),K,OR:RETURN
3270 PUT(X,Y)-(T,U),L,OR:RETURN
3280 PUT(X,Y)-(T,U),M,OR:RETURN
3290 PUT(X,Y)-(T,U),N,OR:RETURN
3300 PUT(X,Y)-(T,U),O,OR:RETURN
3310 PUT(X,Y)-(T,U),P,OR:RETURN
3320 PUT(X,Y)-(T,U),Q,OR:RETURN
3330 PUT(X,Y)-(T,U),R,OR:RETURN
3340 PUT(X,Y)-(T,U),S,OR:RETURN
3350 PUT(X,Y)-(T,U),T,OR:RETURN
3360 PUT(X,Y)-(T,U),U,OR:RETURN
3370 PUT(X,Y)-(T,U),V,OR:RETURN
3380 PUT(X,Y)-(T,U),W,OR:RETURN
3390 PUT(X,Y)-(T,U),X,OR:RETURN
3400 PUT(X,Y)-(T,U),Y,OR:RETURN
3410 PUT(X,Y)-(T,U),Z,OR:RETURN
3420 PUT(X,Y)-(T,U),QU,OR:RETURN
```

Books and Machine Code

***Pam D'Arcy** digs into her bookcase to answer some common questions.*

I DOUBT that there have been many new books published specifically for the Dragon since the demise of Dragon Data in 1984 but as the list that I have put together recently almost doubles the last list published (June 1984), I think that it is time that we had an update. The dates are the issue of 'Dragon User' containing the reference, followed by the page number. 'Other information' dates only include the earliest reference as far as advertising goes. Should any readers know of any other books, please let us all in on the secret!

Regarding availability of the books, I find that library bookshelves still carry a large range of Dragon books. General bookshops are another good source. The 'heavies' (Zaks and Leventhal) can often be found on their shelves as well as in good home computer shops — and the Tottenham Court Road abounds with them if all else fails! I also write direct to publishers if having particular problems (addresses obtained from libraries).

The *Dragon 32 Memory Map* is still available for £5 from Hilton Computer Services, 10 Jerome Road, Larkield, Kent ME20 6UR. I still have some copies of *Inside the Dragon* at the publisher's final reduction (£3 including £1 postage!)

Machine Code

The reason for putting together the booklist was that the most common questions that readers write to ask me are which machine code book, which Assembler, where can I get a list of Dragon ROM addresses from, closely followed by which DOS????

The machine code book would of course be the beginner's guide that a well known publisher commissioned me to write, then, understandably, abandoned because of Dragon Data going under.... However, it was becoming apparent to me as I was writing the book that I was being asked more and more to write about the 'more exciting' aspects of graphics and sound than for it to be truly a beginner's guide and that is the nub of many of the problems. As one of the parents who thumbed through *Inside the Dragon* said, 'But what are the graphics like; that is what my son would want to do'...

As with anything in life, what suits one person doesn't suit another. I came into 6809 Assembler on Leventhal on an OS9 machine. I was the first person at the site to write an Assembler program (BASIC09 being the language at that time) and I found that neither Leventhal nor the manuals were any help in those early stages with the most fundamental aspect of 6809 machine code — what to do about, with, why the hardware stack? I did as Leventhal always seemed to do (LDS $0100) and crashed spectacularly...

The words used in a book, the typeface — we all suffer from those idiosyncrasies that put a barrier between us and persevering. The hours I spent poring over those early (and later) Leventhal chapters — I thought that I would never learn — only to discover that 90% of it is not needed, and much of that becomes much more understandable when one has been coding for a little while. Then one can go back and realise the cause and effect and better ways of doing things

because of the architecture of the machine and such like.

As for the books...not possessing copies of every machine code book, I cannot give a complete opinion. My opinions are also tempered by my programming background. David Barrow's *6809 Machine Code Programming* received a favourable review in the November 1984 issue. I have never seen it about and, not particularly needing a copy apart from curiosity, have not gone out of my way to get hold of it. Being published later than most machine code books, it would seem a useful prospect.

Fewer mistakes

The books that I work from are *Inside the Dragon* and the Leventhal and Zaks books. *Inside the Dragon* was a revelation to me as so many books contain so many errors. It is fairly easy to spot an error in a BASIC program, but how can a beginner possibly spot and put right machine code errors? Even mainly BASIC books with bits and pieces of machine code (including Sunshine books!) are notorious for this. I haven't tried all the machine code in *Inside the Dragon*, but the only mistake I have come across in this well thumbed book is on page 215 where it mentions the cassette gap flag byte being $01 for 'continuous stream' whereas it is actually $00 (correct on page 248). It was co-written by a Dragon Data employee and contains much useful Dragon hardware and ROM information.

The Leventhal (6809 Assembly Language Programming) and Zaks (Programming the 6809) are no help to the Dragon programmer as such. I find the strength of the Leventhal is the detailed examples it gives when describing each instruction and, even more valuable for patching programs when testing, is the full, numerically sequenced postbyte table in the Appendices. I reckon that that table alone has paid back its £14 cost many times over for me in the past! The Zaks is the more recent of the two books and I feel that it contains much more easily assimilated programming examples for beginners than the Leventhal and with a page per instruction, the instruction code boldly displayed at the head of pages, it is a much easier proposition for the quick check when coding!

Do skip bits of a book and go back over it later if you are struggling — our learning patterns differ so much. So many books seem to be so technical at the beginning that we can get bogged down and give up.

The right tools

I think it essential that would-be machine coders purchase the tools for the job. They are very reasonably priced these days and can only help you get to grips with machine code more quickly. I consider the tools to be a disassembler, an assembler and a monitor.

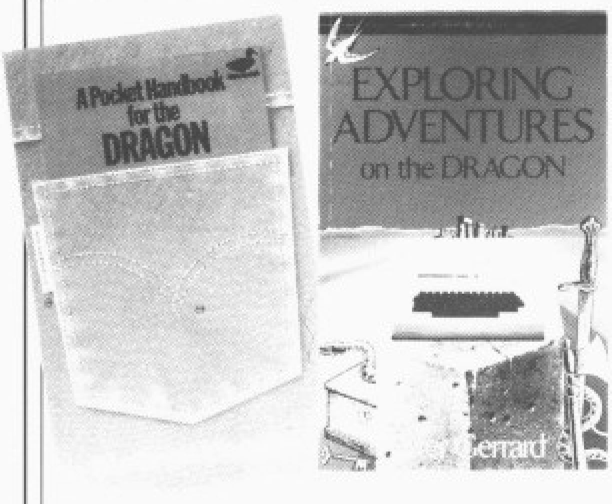
I believe that a lot can be learnt from others. There is no one way of programming. By possessing a DISASSEMBLER, chunks of machine code can be disassembled (turned into 'look-a-like' source code) and examined even though the source code is not given in articles, etc.)

The ASSEMBLER allows you to write source code and assembles (=translates) it to machine code for you.

A MONITOR helps when you come to test a machine code program. In BASIC you can TRON (trace on). A monitor will help you trace through the path that your machine code is (no doubt, unpredictably) taking.

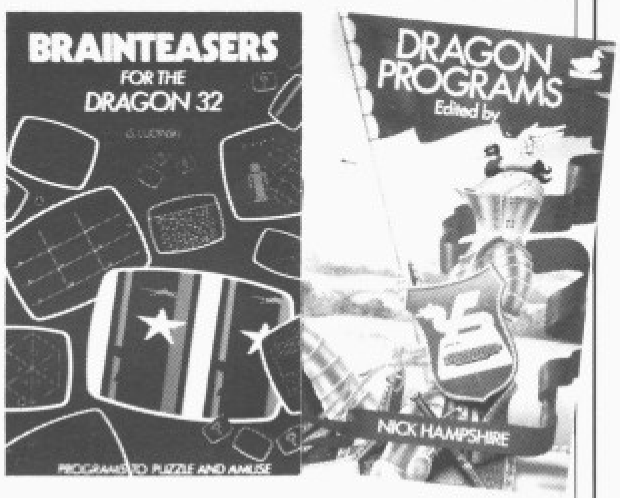
There are still two commonly available sets of of tools available on the Dragon — DASM/DEMON (from Compusense) and ALLDREAM (from Grosvenor). I am a dedicated DREAM user and have never seen DASM/DEMON in use, yet alone tried it so cannot comment upon the differences/ease of use etc. *Inside the Dragon* uses DREAM for its examples whereas most other books use the earlier available DASM. Both are available on cartridge. I know that DREAM is available on disk when the cartridge port is needed for a disk controller; I do not know about DASM. DASM/DEMON was reviewed briefly in the September 1983 issue, ALLDREAM more thoroughly in September 1985. Looking over my index, there are further references to DREAM in the July 1984, October 1984 and June 1986 issues.

Perhaps now you can see why asking for recommendation of a machine code book or an Assembler presents such a difficult problem.



DRAGON BOOKS

List compiled
5th July 1986



Title	Publisher	Author	Review(pp)	Other info
35 Programs for the Dragon32	Softec	Hartnell		June84(36)booklist
60 Programs for the Dragon32	Pan	Erskine+Walw		July84(04)complaint
6809 Assembly Language Programming	Osborne/McGrawHill	Leventhal	Sept84(39)	
6809 Machine Code Programming	Granada	Barrow	Nov 84(39)	
Advanced Sound&Graphics for the Dragon32	Sunshine	Brain K&S	July84(33)	Sept83(extract)
All about FORTH	M&J Software	Haydon		June84(36)booklist
Anatomy of the Dragon	Sigma (Wiley)	James		Dec 83(35)advert
Arcade Games in BASIC (Tandy&Dragon)	Reston	King Bell	Mar 85(37)	
Artificial Intelligence on the Dragon	Sunshine	Brain K&S		Nov 85(38)advert
BASIC for your Dragon64/32 made easy	Arrow Books	Marshall	Jan 85(41)	
Beginner's Guide to FORTH (The)	Interface Publcns.	Johns	Feb 85(37)	
Best of PCW software for your Dragon	Centurion			avail.from J.Penn
Boots Guide to the Dragon32	Granada	Sinclair	June84(37)	
Brainteasers for the Dragon32	Phoenix Pub. Assoc	Lucinski	Dec 84(23)	July84(08)advert
Color Computer Graphics	Radio Shack=Tandy	Barden		from Tandy shops
Color Computer Songbook (The)	Arksoft	Clark		June84(36)booklist

Creating Adventure Games for your Dragon	Interface Publcns.	Gifford	Jan 85(41)	
Dr. Watson Beginner's Basicfor the Drag.	Honeyfold			May 85(30)advert
Dragon Companion (The)	unknown	Jarvis		June83(30)advert
Dragon Extravaganza	V&H Comp.Services	Valentine		June84(36)booklist
Dragon Machine Code	Shiva	Jones+Cowsil	Dec 84(23)	Oct 84(43)advert
Dragon Machine Code/Absolute Beginners	Melbourne House	Reyden J V		Mar 86(04)errors in
Dragon Magic	Foulsham	Wadman	June84(36)	
Dragon Programmer (The)	Granada	Gee		June84(36)booklist
Dragon Programs	Duckworth	Hampshire	Feb 85(37)	
Dragon Trainer (The)	Sunshine	Lloyd	June84(39)	Nov83/Sep84 error in
Dragon32 Book of Games (The)	Granada	James+2		June84(36)booklist
Dragon32 Games Master	Sunshine	Brain K&S		June83(16)advert
Dragon32 Machine Code for Beginners	Compudat	James		Oct 83(54)advert
Dragon32 Memory Map (10 pages/611 locs.)	Hilton Comp.Servic	Elkin		avail.from Hilton
Dragon32 Programmer's Reference Book	Melbourne House	Reyden J V	June84(43)	
Dragon32 Reference Booklet (The)	Elkan Electronics			July83(08)news desk
Dragon32 and how to make the most of it	Granada	Sinclair		June84(36)booklist
DragonDOS - a Programmer's Guide	Grosvenor Software	Kerry	Mar 86(19)	avail.Grosvenor S/w
Dynamic Games for the Dragon32	Interface Publcns.	Young+2		May 83(20)advert
Easy Programming for the Dragon32	Shiva	Stewart+Jame		June84(36)booklist
Enter the Dragon	Melbourne House	Carter		Jan 86(12)advert
Exploring Adventures on the Dragon	Duckworth	Gerrard	Nov 84(39)	Aug 84(16)advert
FORTH for Micros	Newnes	Oakley	Mar 85(37)	
Forward 100 (LOGO)	Viking	Hammond	Mar 85(37)	
Further Programming for the Dragon32	Shiva	Stewart+Jame		June84(36)booklist
Gateway to Computing with the Dragon32	Shiva	Stewart		Dec 84(30)advert
Getting the most from your Dragon32	Penguin	Bannister	June84(37)	Jan 84(30)advert
Giant Book of Games for your Dragon	Fontana	Hartnell+3	Dec 84(23)	
Going Ahead with Color BASIC	Radio Shack=Tandy			Nov 84(39)rec.in txt
Hot Programs to Feed your Dragon	Sigma (Wiley)	James		Dec 83(35)/Aug 84(05
Inside the Dragon	Addison Wesley	Smeed&Somerv	July84(35)	Mar84/Sep84/Pamcomms
Intro.to BASIC programming(=Drag.Manual)	Dragon Data	Wadman		Avail. Compusense
Introducing Dragon Machine Code	Granada	Sinclair	Sept84(38)	
Introducing Pascal	Granada	Allan	Feb 85(37)	
Introduction Cumana DOS for Dragon32&64	Cumana			May 86(06)news desk
Introduction to DragonDOS (An)	Dragon Data	Mayer		with DragonDOS cartr
Know your Dragon	Tiny Pub. Company	Monro		July84(04)recommendn
Language of the Dragon (The)	Sigma (Wiley)	James		Dec 83(35)advert
Learning to use the Dragon32	Gower	Knight	June84(37)	
Learning to use the Dragon32 computer	unknown	Bradbeer		June83(26)advert
Load and Go with your Dragon	Phipps Associates	Phipps+Tomms		May 83(32)advert
MC6809 Cookbook (The)	unknown	Warren		June84(36)booklist
MC6809 Microprocessor Summary Card	Motorola			avail. Compusense
Make the most of your Dragon32	Interface Publcns.	Gifford		May 83(20)advert
Pocket Handbook for the Dragon (A)	Duckworth	Gerrard+Doyl	Feb 85(37)	
Power of the Dragon (The)	Microsource	Sharp+Botton		May 83(14)advert
Programming the 6809	Sybex	Zaks+Labiak	Sept84(39)	
Programming the Dragon for Games&Graphic	McGraw-Hill	Phillips		Oct 83(30)advert
Programming the Dragon32	Newnes	Lafferty	Jan 85(41)	Mar 84(53)advert
Reference Card for the Dragon32	Nano Systems Corp.			Sept83(31)advert
TRS-80 Color Computer Technical Ref.Man.	Radio Shack=Tandy	Chatham		from Tandy shops
The Penguin Book of Personal Computing	Penguin	Graham	Mar 85(37)	
Training your Dragon32&64	Prentice Hall	Collins+Shar	Nov 84(39)	
Using Floppy Disks/Dragon (DeltaDOS)	Cumana/Premier	Johnson+Davi		with DeltaDOS cartr?
Working Dragon32 (The)	Sunshine	Lawrence	June84(40)	May 83(42)advert

(71 books)

PUT ... EOR

C.C.A. Smith *adds an exclusive OR to PUT and shows everyone up.*

IT HAS often struck me as strange and frustrating that although the parameters for the PUT command include AND and OR, they do not include the third logical function — EOR (exclusive OR).

The program shown here corrects that deficiency. There is also a short demonstration program which shows the effect of overlapping colours using EOR.

When a portion of a graphics screen is saved in an array using GET with the G option, there are a number of ways in which the PUT command may be used to display it. The PSET parameter displays it in exactly the same colours as the original, obliterating whatever it covers; PRESET reverses the array colours before displaying; NOT does not display the array at all — it reverses the colours in the screen area signified. With the two remaining parameters — AND and OR — the colour of each point displayed is determined by a comparison of the corresponding points in the array and the existing screen area. A table showing array colour screen colour and resulting colour for AND and OR is given in ***figures 1 and 2***.

So far so good. But take the following situation: a program has been written in which an X-shaped cursor moves across a 4 colour hi-res screen. The X is saved in an array as red on green, using GET with the G option. Which PUT parameter to use? Obviously not PSET, which would always show the cross against a green background. In fact the OR option is normally used, but it does have the drawback that the cross disappears when placed on a red background.

The solution is to use EOR. Each point of the cross now shows up clearly against whichever colour it is placed over. It works equally well with two-colour graphics. ***Figure 3*** shows the effect of EORing different colour combinations.

The BASIC program below loads the machine code routine at the top of available BASIC RAM and writes a JUMP to the start address in the RAM hook at $1AO. After running the program, the new PUT option will remain available until there is a cold restart — or the machine is turned off — or until the machine code is overwritten. In the last case, which should only happen if a new m/c routine is loaded, make sure either to re-run the EOR set-up program, or to switch off the utility with **POKE 416,57.**

For the sake of simplicity, I have used 'X' (for eXclusive) as the new parameter, but almost any character or BASIC keyword could be used if the 73rd byte of the data is altered to the relevant value.

Figure 1 AND
array colour

4	3	2	1	screen colour
4	3	2	1	4
3	3	1	1	3
2	1	2	1	2
1	1	1	1	1

Figure 2 OR
array colour

4	3	2	1	screen colour
4	4	4	4	4
4	3	4	3	3
4	4	2	2	2
4	3	2	1	1

Figure 3 EOR
array colour

4	3	2	1	screen colour
1	2	3	4	4
2	1	4	3	3
3	4	1	2	2
4	3	2	1	1

```
1 '****************************
2 '**                        **
3 '**        PUT..EOR        **
4 '** (C) 13/5/85            **
5 '**          PARIMGOLD LTD **
6 '** WRITTEN BY CLIFF SMITH**
7 '**                        **
8 '****************************
10 PCLEAR8:CLEAR 200,&H7FFF
11 REM if your program contains
   any m/c routines delete the
   'clear' statement and put it
   here.
20 IF PEEK(416) <> 126 THEN
   GOSUB 60000:CLEAR 200,A-1
30 REM demo program follows ....
   or  cload your program
40 DIMQ(140):PMODE3,1:TIMER=3000
50 IF TIMER > 3000 THEN TIMER=0:
   PCLS RND(4):SCREEN1,0
60 R=RND(3)+1:R1=RND(36):
   R2=RND(184):R3=RND(120)
70 PMODE 3,5:PCLS:CIRCLE(36,36),
   R1,R:PAINT(36,36),R,R
80 GET(0,0)-(71,71),Q,G
90 PMODE 3,1: PUT(R2,R3)-(R2+71,
   R3+71),Q,X
100 GOTO50
60000 'put eor routine
60010 '
60020 DEFFNA(A)=INT(A/256):
      DEFFNB(A)=A-FNA(A)*256
60030 DATA 34,11,0D,D8,27,07,AE,
  63,8C,AA,FA,27,02,35,91,32,65,
  81,40,26,02,9D,9F,BD,A7,1D,BD,
  89,AA,BD,AC,67,1F,10,EE,84,33,
  5E,33,CB,DF,D1,30,02,E6
60040 DATA 84,58,3A,9F,CF,96,06,
  27,03,7E,AA,ED,0F,D4,9D,A5,26,
  03,7E,AB,52,03,D4,BD,89,AA,81,
  58,27,03,7E,AB,35,31,8C,06,CE,
  AC,4C,7E,AB,49,A8,84,A7,84,7E,
  AC,4C
60050 A= 256*PEEK(39) + PEEK(40)
      -100
60060 D=0:FORB=0TO 93
60070 READA$:C=VAL("&H"+A$):
      D=D+C:POKEA+B,C:NEXT
60080 IF D <> 10645 THEN PRINT
"error in data statements":END
60090 POKE417,FNA(A):
      POKE418,FNB(A)
60100 POKE416,126:RETURN
```

```
*************************
**      PUT..EOR       **
*************************
@STRT   PSHS    CC,X
        TST     $D8
        BEQ     NOGO
        LDX     3,S
        CMPX    £$AAFA
        BEQ     NOGO+2
NOGO    PULS    CC,X,PC
        LEAS    5,S
        CMPA    £$40
        BNE     LBL1
        JSR     $9F
LBL1    JSR     $A71D
        JSR     $89AA
        JSR     $AC67
        TFR     X,D
        LDU     ,X
        LEAU    -2,U
        LEAU    D,U
        STU     $D1
        LEAX    2,X
        LDB     ,X
        ASLB
        ABX
        STX     $CF
        LDA     $06
        BEQ     LBL2
        JMP     $AAED
LBL2    CLR     $D4
        JSR     $A5
        BNE     LBL3
        JMP     $AB52
LBL3    COM     $D4
        JSR     $89AA
        CMPA    £$58
        BEQ     XOR
        JMP     $AB35
XOR     LEAY    PUTIT,PCR
        LDU     £$AC4C
        JMP     $AB49
*
PUTIT   EORA    ,X
        STA     ,X
        JMP     $AC4C
*************************
```

Core Wars

***Ziv Eliraz** pits program against program with a game that 'strains the mind more than the hand'.*

USUALLY programs have fairly peaceful jobs: just running Spreadsheets, Space Invaders and the like, but with *Core Wars* programs they have to fight for the right to run!

I got the idea for programming *Core Wars* from *Scientific American*, in which A.K. Dewdney explains the subject. *Core Wars* uses a language called *Red Code*, which is similar to 'Assembler', but it has only nine commands.

The purpose of *Red Code* is to corrupt your enemy's program by bombing it with unexecutable statements and thus forcing it to crash. The programs are held in the Core, which can be defined as a group of memory locations set up in a circle where there is no beginning and no end. Our specific Core will have 192 locations in which the programs can work. Because of this, the programs will have to be short and efficient as well as deadly.

Before I describe how to load and run the programs, here's a rundown of all the commands. Note that A and B are parameters and not variables. Actually, there are no variables in *Red Code*.

1) **DAT A** - This statement is used to hold data. As it is not executable, it can also be used to stop a program.
2) **MOV A B** - Move the content of address A to address B. This command will move the content of A even if it is a command.
3) **ADD A B** - Add the contents of address A to address B. A is unchanged.
4) **SUB A B** - Subtract contents of A from B. A is unchanged.
5) **JMP A** - Transfer control to address A.
6) **JMZ A B** - Transfer control to address A if contents of B are 0 (e.g. in a DAT).
7) **JMG A B** - Transfer control to address A if contents of B are bigger than 0.
8) **DJZ A B** - Decrease content of address B. If it is 0 — jump to address A.
9) **CMP A B** - Compare contents of A and B. If unequal, skip the next instruction.

Note: A and B are only integers from -128 to +127. There are three addressing modes in Red Code:

Immediate: A '#' symbolizes this mode. It means that the number after it will be treated as and integer. DAT #5 will store 5 where the DAT appears.

Direct: Just is says. When reaching a number in this mode the computer will go directly to the location specified. JMP 5 will jump 5 adresses forward in the Core.

Indirect: A '@' indicates this mode. I'll explain this with an example. Normally the command MOV 6 7 will take whatever is in 6 locations after it, and put it in the seventh, while MOV @6 7 will go to relative address 6 and see what's in there. It should point to another location, say 9. Then the program will move to relative location 9, see what's in there and only then, move it to 7. A good example for this will be the DWARF program showed later on.

The editor of this program is a pretty simple one (somewhat like the Spectrum's). The top part of the screen (13 top lines) should show you lines 1 — 14 in the program 0, which are now empty. Right now you can press a few keys that will instantly perform the task they stand for. They are:

(Up arrow): Move up through the program.

(Down arrow): Move down the program lines.

(H): Gets you to the help page.

(N): Erases the whole core (Good after messy battles).

(S): Saves the whole core situation.

(L): Loads core situation.

(s): Saves program currently in memory.

(l): Loads a program to the memory.

(C): Compiles a text program to the Core.

(E): Executes the two programs in the memory.

(P): Prints the text of a program to the printer.

(X): Lets you look at the Core without running it.

(1,2,3....64): Lets you edit that line. Type the number and then enter. The line will appear at the bottom of the screen where you can edit it.

To make it easy to try different programs with each other you can have six programs in the text memory simultaneously. You can file through them using the (U) key. Any actions are done relative to that program (saving, loading, compiling etc.).

There are a few steps to running programs together.

1: Think of a few programs! (in this case, two). We'll use two programs by Dewdney: IMP and DWARF. Imp is a one line, primative program that runs through the memory, destroying everything in its path.

MOV 0 1

It moves from relative location 0 (the command itself) to relative 1, and moves to the next location — which is none other than MOV 0 1! This way the whole memory is slowly filled with MOV 0 1, and any program without proper protection is erased.

And Dwarf. This program stays in one place and bombards the core with changing data, every eight locations. It never hits itself but is unlikely to hit Imp. In this battle, Imp usually wins. Here's the program.

```
DAT -1          *pointer to next bomb
ADD #8 -1       *add 8 to pointer
MOV -2 @-2      *move DAT to pointer
                 loc.
JMP -2          *continue the loop
```

2: Clear the memory. Type 'N'. An appropriate message will appear if done correctly.

3: Put the programs in the Core. Type in Imp. (Press (1) + (enter), type MOV 0 1 (enter).

Press (C). The computer will ask you where to put the program. We'll put it at location 70. After a while you'll return to program.

Type in Dwarf as explained with Imp and compile it to location 20.

4: The two programs should be in the memory now. (You can see them with the X option in bank 1, i.e. right joystick up.)

5: Tune (E). Before running the two you must answer a few questions:

How many players: (0-255) — 2 (Imp and Dwarf).

Name for player 1: — Imp

Location: -78 (depends on where you put Imp).

Starts at line: 1 (First line in the Imp).

Name for player 2: Dwarf.

Location: 20.

Start line for Dwarf: 2 (You'll notice Dwarf starts with a DAT. Since we don't want it to die before it's was born, we must start it at the SECOND line.

Moves: (0 — 65535) — 200 (If a player loses, the program will tell you, but just in case there's a tie, without any limit, the programs can go on for ever).

Speed: (0-255) — 100 (a short delay to make us slowly see how our program dies away).

Display (Y/N): If you want to see exactly what goes on in the Core, type Y, and if you want to see a fast conclusion, type N (displaying does take time on Hires).

THAT'S IT! You should be seeing the core now. Press any key and the battle commences!

6: Wait. At then end of EXECUTION time (tee hee) your Dragon will tell you just who won, or if there's a tie.

Sample programs

The display in *Core Wars* takes a very important role in understanding the programs. The Mainframe version of Core Wars just prints out the outcome of the battle, but have no fear, this version has real time action. At first, the display might not seem too understandable but a lot of data has to be seen at once. Cramming 192 locations on one screen is impossible, but 96 is possible indeed. Figure 1 shows how it's done. This shows three programs running at the same time — Imp, Dwarf & Gemini. The little inverse numbers show

what line the programs were running when the battle ended.

There are two parts to this program; the BASIC (edit/compile) and the M/C (execute/display). First type in Listing 1, the BASIC, and save it. Listings 2 is the hex loader for the M/C data; Listing 3 is Hex, hex, and more hex!

To type in the M/C, run the hex loader. Program starts at 27000 and ends at 29292 (yep, this runs with Delta DOS). The loader will show you the memory point. Enter the string and then the checksum.

After you're done entering the M/C, save it with: CSAVEM'CORE WAR', 27000, 29292, 28000 right after the Basic program. (It checks if the code is in, if not it loads the code from the tape.)

If you encounter any problems while running the program (pressed a wrong key, etc.) you can press (BREAK), type GOTO and (ENTER).

You can see no program died but Dwarf started sending bombs, Imp copied itself a few times and Gemini copied itself into bank 2. When running the programs the right joystick selects between the two banks of memory (up=bank 1, down=bank 2). Even with 64 characters per line it's not possible to display the actual signs of the numbers (+ and -) so to tell between 2 and -2 we use 2 for 2 and 254 for -2. To find out what a certain number is, if the display show more than 128, then the number is: number-256 (e.g. n = 254 − 256 = − 2).

The memory does seem to end at the second bank but, as said before when you reach the 'end' of the memory the program simply wraps around to location 0, bank 1. That is why there is no need to worry about where your program starts in the memory.

Note: Although the display shows, as in the example, 254 instead of −2, when you type in the program type it AS IT IS: -2, not 254.

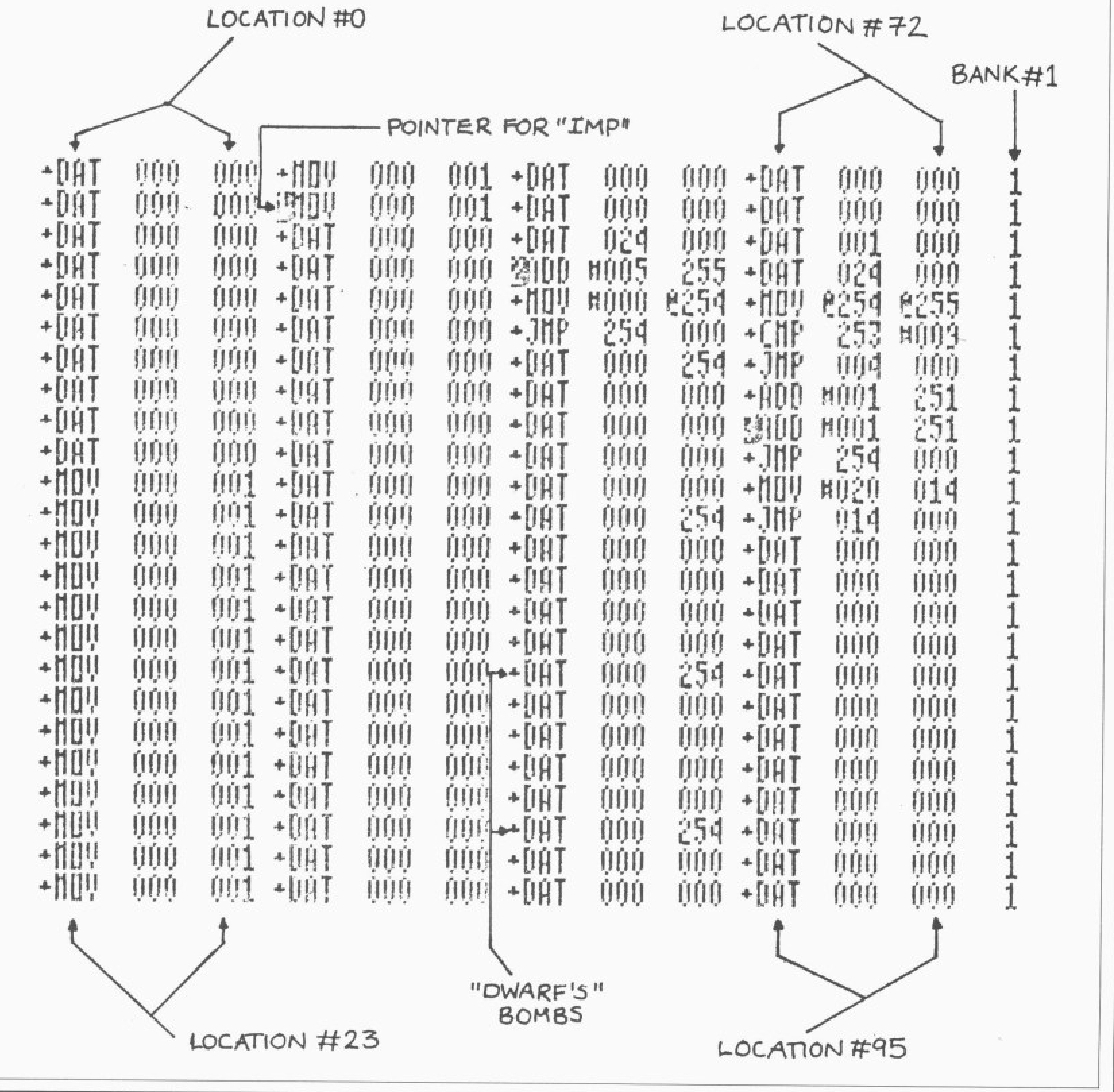
Gemini: This program copies itself to another place in the memory and transfers control to there. Try running it fast, with display.

```
DAT 0
DAT 20
MOV @-2 @-1
CMP -3 #9
JMP 4
ADD #1 -5
ADD #1 -5
JMP -5
MOV -7 14
JMP 14
```

Capturer: This is the smart and able answer to Imp and the like. It captures Imp's pointer and strored it in its end. This could be used later on in multitasking were capturer can control its own pointer for protection and Imp's for, say, duplication.

```
DAT -5
SUB #19 -1
MOV #0 7
SUB -3 6
ADD #11 5
```

Figure 1



MOV 4 @-5
SUB # #1 -6
MOV 3 @-7
JMP -7
DAT 0
JMP @1
JMP 0
It works by setting a 'picket' and checking if it changes. The instant the picket changes, IMP is doomed! Capturer will cut IMP's head off and keep it in it's last command (JMP 0).

Most of the programs above have one task, but since many programs can be run at the same time (up to 255 but the core size is only 192 so my best suggestion for an interesting battle is four to six programs running at once.)

So that's it on my behalf. Remember to plan ahead every move in your programs before sending them to the inner reaches of the Core or the results will be disasterous...after all, who wants to be destroyed by a lousy IMP?

Listing 1 — BASIC

```
0 IF GT=1 THEN 120
10 CLEAR200,26999:CLS:A$=STRING$(32,"*")
:PRINT:PRINTA$;"       CORE WARS SIMULATI
ON":PRINTA$
20 PRINT:PRINT"  PROGRAMMED BY : ZIV ELI
RAZ":PRINT:PRINT" CORE WARS IDEA : A.K.
DEWDNEY"
30 FORI=1 TO 1000:NEXT
40 IF PEEK(27777)<>89 THEN CLOADM"CORE W
ARS
50 PCLEAR8
60 CLS:DIM L(6),LI(6),N$(6),B$(5,65),C(5
),S1$(10):FORI=0 TO 8:READS1$(I):NEXT
70 GT=1
80 LC=1
90 LI=1
100 PR=0
110 A$=""
120 ' main loop                 ********
************************
130 ' PRINT CURRENT LINE STATUS
140 PRINT@480,STRING$(31," ");:PRINT@0,"
";:FOR I=LC TO LC+13:PRINTI;B$(PR,I):NEX
T:PRINTSTRING$(32,"-");:
150 B$=""
160 PRINT@459," PROGRAM";PR;
170 A$=INKEY$:IF A$="" THEN 170 ELSE B$=
B$+A$
180 IF A$=CHR$(13) OR A$=CHR$(8)  THEN B
$=LEFT$(B$,LEN(B$)-1)
190 IF A$=CHR$(8)  AND LEN(B$)>0 THEN B$
=LEFT$(B$,LEN(B$)-1)
200 IF A$="C" THEN 350 ELSE IF A$="S" TH
EN 930 ELSE IF A$="L" THEN 1100 ELSE IF
A$="X" THEN 1120 ELSE IF A$="N" THEN 119
0 ELSE IF A$="U" THEN 1200
210 IF A$="s" THEN 700 ELSE IF A$="l" TH
EN 680 ELSE IF A$="E" THEN 740 ELSE IF A
$="H" THEN 970 ELSE IF A$="P" THEN 1020
220 IF A$=CHR$(94) AND LC>1 THEN LC=LC-1
:GOTO 140 ELSE IF A$=CHR$(10)  AND LC<51
 THEN LC=LC+1:GOTO 140
230 IF A$<>CHR$(13) THEN SOUND 200,1:PRI
NT@480,B$;:GOTO 170
240 A=VAL(B$):IF A>64 THEN A=64 ELSE IF
A<1 THEN A=1
250 'NOW PRINT THE LINE AND EDIT
260 LI$=B$(PR,A)
270 PRINT@480,LI$;CHR$(128);" ";
280 A$=INKEY$:IF A$="" THEN 280
290 IF A$=CHR$(8) AND LEN(LI$)>0  THEN L
I$=LEFT$(LI$,LEN(LI$)-1):GOTO270
300 IF A$=CHR$(13) THEN B$(PR,A)=LI$+" "
:GOTO 140
310 IF A$=CHR$(8) AND LEN(LI$)=0 THEN 27
0
320 IF ASC(A$)<32 THEN 270
330 LI$=LI$+A$
340 GOTO 270
350 'c o m p i l e              ********
***********************
360 C2=0
370 CLS:PRINT"COMPILE":INPUT"MEMORY LOCA
TION TO START AT...";L:PL=2000+L*4:QQ=PL
380 IF L<0 OR L>191 THEN 370
390 FOR LN=1 TO 64
400 C2=0:C3=0
410 'FIRST TEAR UP THE LINE IN        TO
THREE PIECES
420 LN$=B$(PR,LN)
430 IF LN$="" OR LN$=" " THEN NEXTLN:GOT
O 630
440 A=0
450 FOR C=1 TO LEN(LN$)
460 M$=MID$(LN$,C,1):IF M$=" " THEN A=A+
1:C(A)=C:SOUND 1,1
470 NEXTC:S1$=LEFT$(LN$,C(1)-1):S2$=MID$
(LN$,C(1)+1,C(2)-C(1)-1):S3$=RIGHT$(LN$,
LEN(LN$)-C(2))
480 'AFTER THAT,DEFINE ALL POKES    IN
THIS FASION:
490 '
500 ' COMMAND PEEK
510 FORFI=0 TO 9:IFS1$<>S1$(FI)THEN NEXT
FI:PRINT"COMMAND '"S1$"' NOT UNDERSTOOD"
+CHR$(13)+STRING$(11,32)+"********* LINE
"LN:PRINT:PRINT"PRESS ANY KEY...":GOSUB9
10:GOTO 140
520 CM=FI
530 FC$=LEFT$(S2$,1):SC$=LEFT$(S3$,1)
540 IF FC$="#" THEN C2=1:S2$=RIGHT$(S2$,
LEN(S2$)-1)
550 IF FC$="@" THEN C2=2:S2$=RIGHT$(S2$,
LEN(S2$)-1)
560 IF SC$="#" THEN C2=C2+16:S3$=RIGHT$(
S3$,LEN(S3$)-1)
570 IF SC$="@" THEN C2=C2+32:S3$=RIGHT$(
S3$,LEN(S3$)-1)
580 'AND POKE'EM
590 S2=VAL(S2$);S3=VAL(S3$):IF S2<0 THEN
 S2=256+S2
600 IF S3<0 THEN S3=256+S3
610 POKE PL,CM:POKE PL+1,C2:POKE PL+2,S2
:POKE PL+3,S3:PL=PL+4:POKE PL,0:IF PL>27
62 THEN PRINT"please note: YOUR PROGRAM
HAS                 EXCEEDED LOCATION
             192,AND IS PROCED-
    ING TO 0.":PL=2000
```

```
620 NEXTLN
630 PRINT"RAM START "QQ" RAM END";PL::FO
R I=QQ TO PL-1:PRINTHEX$(PEEK(I));",";:N
EXTI:PRINT"0";CHR$(13):PRINT"COMPILATION
-COMPLETED."640 PRINT"PRESS ANY KEY"
650 A$=INKEY$:IF A$="" THEN 650
660 FOR I=PL TO PL+3:POKEI,0:NEXTI
670 GOTO 140
680 CLS:PRINT"LOAD A RED CODE FILE":PRIN
T@192,"LOAD"+CHR$(34);:LINEINPUTA$:PRINT
@197+LEN(A$),CHR$(34)
690 OPEN"I",#-1,A$:FOR I=1 TO 64:INPUT#-
1,B$(PR,I):NEXTI:CLOSE#-1:GOTO 140
700 'SAVE
710 CLS:PRINT"SAVE A RED CODE FILE"
720 PRINT@192,"SAVE"+CHR$(34);:LINEINPUT
A$:PRINT@197+LEN(A$),CHR$(34):OPEN"O",#-
1,A$:FOR I=1 TO 64:PRINT#-1,B$(PR,I):NEX
TI:CLOSE#-1
730 GOTO 140
740 ' e x e c u t e                ********
***********************          T.A.M.A.R

750 ' FILES SHOULD BE IN MEMORY
760 PRINT"EXECUTE":PRINT" CORE SIZE IS 1
92":INPUT"HOW MANY PLAYERS";P:P=P-1:FORI
=0 TO P:PRINT"NAME FOR PLAYER";I+1;:INPU
TN$(I):INPUT"...STARTS AT LOCATION";L(I)
:INPUT"...STARTS AT LINE ";LI(I):NEXT:PO
KE2997,P+1
770 FORI=0 TO 6:POKE1536+I,0:NEXT
780 FORI=0 TO P:L(I)=L(I)*4+2000+(LI(I)-
1)*4:POKE3000+I*2,INT(L(I)/256):POKE3001
+I*2,L(I)-256*PEEK(3000+I*2):NEXTI
790 INPUT"MOVES";MO:M1=INT(MO/256):M2=MO
-M1*256:POKE2998,M1:POKE2999,M2
800 INPUT"SPEED (0=FAST 255=SLOW)";SP:PO
KE 27209,SP
810 INPUT"SEE DISPLAY (Y/N)";A$:IF A$="Y
" THEN POKE 28000,134 ELSE IF A$="N" THE
N POKE28000,57 ELSE 810
820 CLS
830 IF A$="N" THEN 860
840 PMODE 4,5:SCREEN1,1:EXEC28000
850 GOSUB 910:SCREEN1,1
860 EXEC27000:SOUND 200,10:REMARK: TAM A
 REDCODE
870 W=0:GOSUB 910:CLS:PRINT"THESE ARE TH
E RESULTS OF THE    BATTLE: (LOSER/S,IF
ANY,FIRST)":FORI=1536 TO 1538+P:A=PEEK(I
):IF A>0THEN W=W+1:PRINTN$(A-1)
880 NEXTI
890 IF W<=P+1 THEN PRINT"THE REST HAVE N
900 GOSUB 910:GOTO 140
910 A$=INKEY$:IF A$="" THEN 910 ELSE RET
URN
920 ' save code ***************
930 CLS:PRINT"SAVE MEMORY :":PRINT:PRINT
"PRESS ANY KEY WHEN THE TAPE IS  READY..
 ":MOTORON:AUDIOON:GOSUB910:MOTOROFF:AUD
IOOFF:INPUT"SAVE UNDER WHAT NAME";A$
940 CSAVEMA$,2000,2768,41194
950 GOTO 140
960 ' help page                  ********
************************
970 CLS:PRINT"          help page":PRINT"W
HILE EDITING YOUR PROGRAM YOU  CAN TYPE
THE FOLLOWING COMMANDS:* [P] CHANGE PROG
RAM NUMBER":PRINT"* ANY NUMBER FROM 1-64
 + <ENTER>  WILL LET YOU EDIT THAT LINE.
"
980 PRINT"* [N] CLEARS THE CORE
  * [L] LOAD WHOLE CORE SITUATION"
990 PRINT"* [S] SAVE WHOLE CORE SITUATIO
N * [s] SAVE THE PROGRAM LINES    * [l]
LOAD THE PROGRAM LINES     * [C] COMPILE
LINES TO MEMORY    * [E] EXECUTE TWO PROG
RAMS       * [P] PRINT REDCODE PROGRAM
  * [X] TO EXAMINE CORE SITUATION ";
1000 PRINT"PRESS ANY KEY TO RETURN...";:
GOSUB910:GOTO 140
1010 ' printer routine            *******
*************************
1020 CLS:PRINT"PRINTER":PRINT:INPUT"IS Y
OUR PRINTER ON";A$:IF A$="N" THEN PRINT"
I'M WAITING-PRESS ANY KEY":GOSUB 910:GOT
O 1040
1030 IF A$<>"Y" THEN 1020
1040 INPUT"NAME OF PROGRAM";A$
1050 PRINT#-2," RED CODE PROGRAM":PRINT#
-2
1060 S$=STRING$(4+LEN(A$),"*"):PRINT#-2,
S$:PRINT#-2,"* "+A$+" *":PRINT#-2,S$
1070 PRINT#-2:FOR I=1 TO 65
1080 IF B$(PR,I)<>"" THEN PRINT#-2,B$(PR
,I)
1090 NEXTI:PRINT#-2:PRINT#-2:GOTO 140
1100 'LOAD WHOLE CORE
1110 CLS:PRINT:PRINT"LOAD CORE SITUATION
":PRINT:PRINT"READY TAPE AND PRESS ANY K
EY...":MOTORON:AUDIOON:GOSUB910:PRINT:IN
PUT"NAME TO LOAD";A$:CLOADMA$:GOTO 140
1120 'SEE CORE
1130 CLS
1140 POKE 28000,134
1150 PRINT:PRINT"SEE CORE:":PRINT:PRINT"
USE JOYSTICK TO LOOK AT          DIFFEREN
T PARTS IN THE MEMORY.      ":PRINT"PRESS
ANY KEY TO RETURN WHEN    DONE.":PRINT:P
RINT:PRINT"PRESS ANY KEY...":GOSUB910
1160 PMODE 4,5:SCREEN1,1:PCLS:
1170 EXEC28000:A$=INKEY$:IF A$="" THEN 1
170
1180 GOTO 110
1190 CLS:PRINT:PRINT"CLEARING THE CORE..
     :FORI=2000 TO2768:POKEI,0:NEXT:GOTO
 140
1200 PR=PR+1:IF PR>5 THEN PR=0
1210 GOTO 120
1220 DATA DAT,ADD,SUB,MOV,JMP,JMZ,DJZ,CM
P,JMG
```

Listing 2 — HEX LOADER

```
10 CLS:PRINT:PRINT"   CHECKSUM CHECKER":P
RINT:INPUT"START";ST:INPUT"END";EN
20 FORII=ST TO EN STEP 8
30 CS=0:PRINTII;": ";:LINEINPUTA$
40 FORI=1 TO LEN(A$) STEP2
50 M$=MID$(A$,I,2):A=VAL("&H"+M$):POKEII
+I/2,A:CS=CS+A:NEXTI
60 INPUT" = ";C:IF CS<>C THEN PRINT"CHEC
KSUM ERROR":GOTO30
70 NEXTII
```

Listing 3 — HEX DATA

```
27000 : 7F6D568E0600BF6D = 770
27008 : 54BE0BB6BF6D50B6 = 1029
27016 : 0BB5B76D528E0BB8 = 903
27024 : BF6D4DB66D527F6D = 986
27032 : 537F6D4FAE9F6D4D = 917
27040 : 8C00002719BF6D3D = 565
27048 : 8D65BE6D3DB66D4F = 972
27056 : 8101273E8C0AD024 = 625
27064 : 2D8C07CF232EAF9F = 814
27072 : 6D4D7C6D53BE6D4D = 878
27080 : 3002BF6D4DB66D53 = 801
27088 : B16D5226C4BD6D60 = 996
27096 : BE6D50301FBF6D50 = 838
27104 : 8C000026A8393089 = 588
27112 : FD0020D230890300 = 683
27120 : 20CCB66D53BE6D54 = 993
27128 : 4CA780BF6D547C6D = 988
27136 : 56B66D56B16D5224 = 867
27144 : 058E000020B039BE = 602
27152 : 6D3DA6848100273B = 695
27160 : 8101102700F38102 = 559
27168 : 1027014F81032733 = 357
27176 : 8104102701A98105 = 492
27184 : 102701BC81061027 = 434
27192 : 023381071027026E = 356
27200 : 8108102701E93912 = 501
27208 : 8EEA60301F8C0001 = 692
27216 : 26F939128601B76D = 789
27224 : 4F20ECBE6D3DA601 = 874
27232 : 840FB76D3FA602B7 = 853
27240 : 6D408D6FBF6D41BE = 980
27248 : 6D3DA60144444444 = 609
27256 : B76D3FA603B76D40 = 880
27264 : 8D59BF6D43BE6D41 = 961
27272 : 1F138D381F3110BE = 533
27280 : 6D431F238D2E1F32 = 510
27288 : EE84EFA4EE02EF22 = 1286
27296 : BE6D3DA601840F81 = 803
27304 : 012702200CCE0000 = 292
27312 : EFA4BE6D3DEE02EF = 1242
27320 : 22BE6D3D3004BF6D = 746
27328 : 3D16FF8311830AD0 = 835
27336 : 2407118307CF2306 = 446
27344 : 3933C9FD003933C9 = 871
27352 : 0300398D071F138D = 399
27360 : E31F313912B66D3F = 736
27368 : 810027088101270E = 359
27376 : 8102270EB66D40BE = 729
27384 : 6D3D17023739BE6D = 606
27392 : 3D39B66D40BE6D3D = 833
27400 : 170229A602170224 = 295
27408 : 3912BE6D3DA60184 = 734
27416 : 0FB76D3FA602B76D = 830
27424 : 408DB8BF6D41BE6D = 1053
27432 : 3DA6014444444B7 = 683
27440 : 6D3FA603B76D408D = 838
27448 : A2BF6D43BE6D3DA6 = 1055
27456 : 01840FBE6D4110BE = 718
27464 : 6D438101271EA602 = 543
27472 : E622F76D45BB6D45 = 1054
27480 : CE0000EFA4EF22A7 = 1049
27488 : 22BE6D3D3004BF6D = 746
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27504 : 0220DD12BE6D3DA6 = 799
27512 : 01840FB76D3FA602 = 671
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27528 : 41BE6D3DA6014444 = 728
27536 : 4444B76D3FA603B7 = 843
27544 : 6D4017FF3EBF6D43 = 880
27552 : BE6D3DA601840FBE = 864
27560 : 6D4110BE6D438101 = 686
27568 : 271EA602E622B76D = 793
27576 : 45F06D45CE0000EF = 932
27584 : A4EF22A722BE6D3D = 998
27592 : 3004BF6D3D16FE77 = 808
27600 : BE6D3DA60220DD12 = 799
27608 : BE6D3DA601840FB7 = 857
27616 : 6D3FA602B76D4017 = 719
27624 : FEF1BF6D3D16FE57 = 1219
27632 : 12BE6D3DA6014444 = 681
27640 : 4444B76D3FA603B7 = 843
27648 : 6D4017FED6A60281 = 961
27656 : 00270BBE6D3D3004 = 462
27664 : BF6D3D16FE3112BE = 894
27672 : 6D3DA601840FB76D = 776
27680 : 3FA602B76D4017FE = 864
27688 : B2BF6D3D16FE1812 = 857
27696 : BE6D3DA601444444 = 731
27704 : 44B76D3FA603B76D = 884
27712 : 4017FE97A6028100 = 789
27720 : 220BBE6D3D3004BF = 648
27728 : 6D3D16FDF2BE6D3D = 1047
27736 : A601840FB76D3FA6 = 835
27744 : 02B76D4017FE74BF = 942
27752 : 6D3D16FDDA12BE6D = 980
27760 : 3DA60144444444B7 = 683
27768 : 6D3FA603B76D4017 = 720
27776 : FE59A6024AA70281 = 883
27784 : 00270BBE6D3D3004 = 462
27792 : BF6D3D16FDB1BE6D = 1112
27800 : 3DA601840FB76D3F = 730
27808 : A602B76D4017FE33 = 852
27816 : BF6D3D16FD9912BE = 997
27824 : 6D3DA601840FB76D = 776
27832 : 3FB76D49A602B76D = 888
27840 : 4017FE17BF6D41BE = 919
27848 : 6D3DA60144444444 = 609
27856 : B76D3FB76D4BA603 = 891
27864 : B76D4017FDFDBF6D = 1185
27872 : 43BE6D41A602BE6D = 898
27880 : 43E6028D1EF76D45 = 895
27888 : B16D45260BBE6D3D = 764
27896 : 3004BF6D3D16FD47 = 759
27904 : BE6D3D3008BF6D3D = 777
27912 : 16FD3C12B76D47F7 = 963
27920 : 6D48B66D49810127 = 714
27928 : 0EB66D47F66D4BC1 = 999
27936 : 01270BF66D4839BE = 725
27944 : 6D3DA60220EEBE6D = 907
27952 : 3DE6033930863086 = 715
```

```
27960 : 3086308639863086 = 737   28408 : 108E6FE92030108E = 740   28856 : 20A040002060A0A0 = 704
27968 : 3086308639863086 = 737   28416 : 6FEC202A108E6FEF = 929   28864 : E0202000E080E020 = 896
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27984 : E6033912B732EFF7 = 1027  28432 : 108E6FF52018108E = 728   28880 : A0A04000E0202040 = 736
27992 : 32F0B632F1810127 = 932   28440 : 6FF82012108E6FFB = 929   28888 : 4080800040A0A040 = 768
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28008 : B6015B811E240A8E = 621   28456 : 108E70012000BE70 = 605   28904 : 2020C00000400000 = 320
28016 : 07D08601B7701120 = 694   28464 : 06EEA1EF81A6A1A7 = 1267  28912 : 0040000000400000 = 128
28024 : 088E09508602B770 = 670   28472 : 81BF7006BE7004A6 = 910   28920 : 0040800000204080 = 416
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28048 : 7F8600B76E701286 = 818   28496 : E6028D2CBE7004A6 = 889   28944 : 4080000040A02040 = 512
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28064 : 6E6D1700DB862AB7 = 820   28512 : 7006A780BF7006BE = 912   28960 : 8080600040A0A0A0 = 896
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28080 : 043E8D0FB66E7F4C = 717   28528 : 0127078102270686 = 357   28976 : A0A0E00060808080 = 1024
28088 : B76E7FB76E6F8117 = 976   28536 : 2039862339864039 = 570   28984 : 80806000C0A0A0A0 = 1024
28096 : 23D439B66E6F48C6 = 977   28544 : BE7006C1C8240AC1 = 940   28992 : A0A0C000E08080C0 = 1184
28104 : 803D1F01B66E7030 = 673   28552 : 64240E8630A78020 = 659   29000 : 8080E000E08080C0 = 1152
28112 : 891E003086BF6E6B = 757   28560 : 108632A780C0C820 = 919   29008 : 80808000608080E0 = 960
28120 : BE6E6DA680BF6E6D = 1113  28568 : 088631A780C06420 = 810   29016 : A0A06000A0A0A0E0 = 1120
28128 : 812A27048D0320F0 = 630   28576 : 008600F77008C100 = 694   29024 : A0A0A000E0404040 = 896
28136 : 3912C60880203D1F = 533   28584 : 27074F8B01195A26 = 418   29032 : 4040E00060202020 = 544
28144 : 0231A9701CBE6E6B = 767   28592 : FAB7700844444444 = 825   29040 : 20A04000A0A0C0A0 = 928
28152 : B66E714C81032726 = 690   28600 : 8B30A780B6700884 = 916   29048 : A0A0A00080808080 = 992
28160 : B76E717F700CBF70 = 960   28608 : 0F8B30A781BF7006 = 807   29056 : 8080E000A0E0A0A0 = 1184
28168 : 0D10BF700FA6A0A7 = 840   28616 : 394F108E0BB8EEA1 = 888   29064 : A0A0A00080E0A0A0 = 1152
28176 : 843088207C700CF6 = 842   28624 : 11B3700427074CB1 = 611   29072 : A0A0A000E0A0A0A0 = 1184
28184 : 700CC10723EFBE70 = 900   28632 : 0BB525F23910BE70 = 846   29080 : A0A0E000C0A0A0C0 = 1248
28192 : 0D10BE700F398601 = 538   28640 : 068B60A73F806020 = 727   29088 : 8080800040A0A0A0 = 928
28200 : BF0500B76E71BE6E = 902   28648 : ED44415441444453 = 738   29096 : A0C0A000C0A0A0C0 = 1216
28208 : 6B3001BF6E6BC600 = 762   28656 : 55424D4F564A4D50 = 624   29104 : A0A0A00040A08040 = 896
28216 : E784E78820E78840 = 1193  28664 : 4A4D5A444A5A434D = 617   29112 : 20A04000E0404040 = 672
28224 : E78860E7890080E7 = 1190  28672 : 504A4D474D5A444A = 611   29120 : 40404000A0A0A0A0 = 832
28232 : 8900A0E78900C0E7 = 1088  28680 : 5A434D504A4D4700 = 536   29128 : A0A04000A0A0A0A0 = 1024
28240 : 8900E0BE0500C601 = 755   28688 : 000000FFFFFFFF00 = 1020  29136 : A0404000A0A0A0A0 = 928
28248 : A6A044444444AA84 = 900   28696 : 000000FF00000000 = 255   29144 : A0E0A000A0A04040 = 992
28256 : A7843088205CC108 = 808   28704 : 0000000040404040 = 256   29152 : A0A0A000A0A0A040 = 1024
28264 : 23EE39351F044018 = 506   28712 : 40004000A0A00000 = 448   29160 : 40404000E0202040 = 544
28272 : 0002484920544845 = 404   28720 : 0000000000A0E0A0 = 544   29168 : 8080E00000000000 = 480
28280 : 524520414C4C2A18 = 466   28728 : E0A0000040E080E0 = 1024  29176 : 0000000000000000 = 0
28288 : 128E0400BF700686 = 607   28736 : 20E040000020A020 = 544   29184 : 0000000000000000 = 0
28296 : 20A7808C043F23F9 = 818   28744 : 4080A00040A0A040 = 800   29192 : 0000000000000000 = 0
28304 : BE7004BF70098D2A = 801   28752 : A0A0600040400000 = 544   29200 : 00000000B0505050 = 416
28312 : BE7004308860BF70 = 889   28760 : 0000000040808080 = 448   29208 : 5050B0F0B030B0B0 = 1152
28320 : 048D1FBE70043088 = 666   28768 : 8080400040202020 = 480   29216 : B0B010F0B050D0B0 = 1248
28328 : 60BF70048D14BE70 = 866   28776 : 202040000000A040 = 352   29224 : 707010F010D0D0B0 = 1088
28336 : 04308860BF70048D = 732   28784 : A0000000000040E0 = 448   29232 : D050B0F0D0905050 = 1216
28344 : 09BE70093004BF70 = 675   28792 : 4000000000000000 = 64    29240 : 10D0D0F0107010D0 = 1024
28352 : 0439BE7006862BA7 = 713   28800 : 00408000000000E0 = 416   29248 : D050B0F090703050 = 1088
28360 : 80BF70061700FABE = 900   28808 : 0000000000000000 = 0     29256 : 5050B0F010D0D0B0 = 1184
28368 : 7004A68481002720 = 614   28816 : 0000040000202040 = 132   29264 : B07070F0B05050B0 = 1152
28376 : 8101272281022724 = 409   28824 : 4080800040A0A0A0 = 864   29272 : 5050B0F0B0505090 = 1056
28384 : 8103272681042728 = 421   28832 : A0A0400040C04040 = 768   29280 : D0D030F0F0000000 = 944
28392 : 8105272A8106272C = 433   28840 : 4040E00040A02040 = 672   29288 : 0000000000505050 = 240
28400 : 8107272E81082730 = 445   28848 : 8080E000E0202040 = 832   29296 : 5050B0F0B030B0B0 = 1152
```

Get Logical

***Geoff Campbell** and **Jason Orbaum** look at Boolean theory...*

YES!! This is the month in which we go over AND, OR, EOR, and NOT.

So, to Boolean logic, a topic which scares many, but for absolutely no reason at all, as it is actually extremely easy. We will cover the theory this month, and follow it up with some practical applications next time. For those of you familiar with the GET and PUT commands in Microsoft Extended BASIC on the Dragon (though why the heck you should be programming in BASIC any more is totally beyond us) the commands AND, OR, EOR, and NOT should need very little explanation. However, for those pure of mind and body there follows an explanation of AND, OR, NOT and the ever so mysterious EOR.

The instructions are all BITWISE, which means that, although they work on bytes, the result is purely dependant on individual bits within the two original bytes. For example, we might as well start with the NOT instruction, which is the only one that has only one operand. If we have a value A, NOT A is the one's complement — see last month's article. This is expressed as -A.

If we want to express the value C as the logical AND of two values A and B, we write C = A . B (or C = A * B), which is equivalent to the arithmetic multiply, for reasons that will hopefully become clear. To work the value out, any bit in C is set (=1) if both bits in A and B are set, else they are reset (=0). If we let A = 01110011, and let B = 00011101, then c = 01110011 . 00011101, or:

```
    01110011
    00011101
    ========
C = 00010001
```

Moving lightly on, the OR instruction is very similar. WQe would write C = A + B, which is, obviously, equivalent to the arithmetic add instruction (this, along with the previous allusion to arithmetic, will be explained a few lines later). The OR instruction sets a bit in the result if either one of the bits in A and B is set, else resets the bit. Hence, using the values as before, C = A + B becomes:

```
    01110011
    00011101
    ========
C = 01111111
```

This connection with arithmetic is fairly interesting, if of little practical use. If we take any value other than zero as being true (ie set) and zero as false (ie reset), we can move along the two operands and, taking each pair of bits in turn, perform the relevant arithmetic operation to get the same result. The tables below illustrate this, as well as giving all combinations of bits.

A	B	A + B
0	0	0
0	1	1
1	0	1
1	1	1

A	B	A . B
0	0	0
0	1	0
1	0	0
1	1	1

Now, all got that? Good. We can now move on to the more interesting instruction, Exclusive OR, EOR for short. This has no symbol that we can remember, so forget the arithmetic connection for now. With EOR, a bit in the result is set if one or the other, but not both, of the source bits is set. It can be expressed in terms of the preceding three instructions, as:

C = -(-(A * B) + (A * B))

Going back to our previous figures, we get:

```
01110011
00011101
========
01101110
```

Simple eh?

We will cover practical applications, which are legion, at a later date. And that's about it for this month, save to tell you that next month's is a VERY important episode in our existing series!!

Next month we will be publishing a comprehensive table of all the commands necessary for simple machine coding on the Dragon, along with a revision description of each command. That marks the end of this first set of Machine code articles but after a one month break we'll be back with a second set to explain all the really useful stuff like sound, graphics, interrupts (maybe!), and data processing.

Scott Adams Adventures

*... and **Jason Orbaum** starts revisiting the Adams family of adventures.*

ARMED with a nearly full set of Scott Adams adventures, we set off to crack them all, and failed miserably!! However, at this point the letterbox clattered and onto the mat fell the hintbook... In a state of jubilant shock we rushed to the doormat, opened it, and decided that it was cheating so we couldn't use it. So, what this article intends to do is help you with the earlier problems in these adventures (ie the ones we have solved), and provide you with a short review.

Before we start the review here are some general hints and trends in Scott's adventuring...

1) All Scott's games are fairly easy to map once you realise that some exits from some locations actually take you nowhere!!

2) Scott has a wicked sense of humour and loves pun and word play.

3) HELP usually returns some sort of hint.

4) Not every object always has a use but there are very few red herrings.

The code we will be using to print clues to the adventures is simple. Simply read alternate letters and ignore the spares!! The reason they are coded is to prevent you from reading a clue you don't want to read.

So then, to the first of the adventures:

ADVENTURELAND.

The story: you find yourself in a mystical land of Dragons and Magic, and the aim is simply to collect thirteen treasures and store them away.

The adventure: this is a very good adventure to play as a first, because although it is not as easy as *Pirate Adventure*, it lays down a set of ground rules and conventions which tend to hold true not only across the entire range of Scott Adams adventures but across adventuring as a whole. Its problems are now cliched but it must be remembered these are the originals. It plays very well, and tends to open up at just the correct rate. Don't worry if you can't solve the first problems you come across straight away, often, the objects you need come later on in the adventure. In the progress of your adventure you should come across a sleeping dragon, a rather nervous bear, some killer bees, a genie, and nice bit of pyrotecnics. A good game, not too hard, and an ideal introduction to the series. Don't use the hints unless you absolutely have to as you'll find it spoils your sense of satisfaction when you do finish the adventure.

The hints:

- Cannot catch the fish?
NQEWEEDRNTEYTUAINODPBAOSTDT FLGEHOJFKWLAZTXECR

- Stuck in the maze?
MEAAGSIDCECAASRDPEEATSFDLEIA ESS

- Cannot get past bricked up wall?
BWLEORWTIYTUUIPQWEISTDHFBELF ATDBDNEHR

- Missing a crown?
- GEOETEHEREOENEEEREOEOEM

- Cannot get ox from quicksand?
- TEHRERADXQEHITSJMUAFGCIUC

- Cannot get firestone from lava?
DGAQMWLEARVTAYAUNIDICPOPOXL HIVT

- Cannot get mirror from bear?
- SACERIEOAUM

- Cannot wake dragon?
BAREIINOGUBAEEEISOTUOADERIAO GUOAN

- Need last treasure?
- RPUWBSLDAEMFP

Mini Logo

Mike Hosken *presents a compact Dragon version of 'turtle graphics'.*

LOGO can mean all sorts of different things to different people. It may provide the means of controlling a 'real turtle' as it grinds ever so accurately across the floor of the primary school, drawing shapes at the behest of its infant operators.

Or it may be used to provide a model of recursion in advanced courses in computer science.

Dragon owners have long been able to purchase full-bodied versions of the language. And there can be no substitute for the real thing.

But for those whose chief interest lies in turtle graphics on the screen there is no secret when it comes to using Dragon Basic to produce the required effect. The inability to combine standard Dragon characters with graphics is a disadvantage, of course, requiring that all letters and numbers should be defined as graphics characters. So lines 180 to 560 are taken up with a full set plus square brackets.

Now it may well be that you already have such a set of graphic symbols. If that is the case then the sensible thing to do here is to load your set from some other program, delete the unwanted sections, renumber if necessary, and then type in the remainder of the Minilogo lines. (Conversely, a full set is provided here even though some cannot be recognised by the command structure, in case you have a use for a coherent set elsewhere in your programming.)

But to begin at the beginning . . .

Users who haven't come across turtle graphics (Grandma?) need some guidance, provided here in the opening lines, up to 120, and illustrated as a print-out in **Figure 1.**

The whole initialisation section, 130 to 660 plus the turtle draw 9-line subroutine, takes a measurable time to execute. But by filling the screen first (without the use of any variables) there is no obvious delay at all and yet the first graphics screen is almost ready to be revealed.

So string space is reserved, and arrays DIMensioned before getting the Dragon to learn its letters. Then at line 570 PMODE can be prepared, with no matching SCREEN command yet. 580 sets the initial position variables, plus R to take account of the Dragon's predilection for working in radians. The 610 to 640 take us into action.

Characters, even 'illegal' ones, are displayed quite quickly on the graphics screen as a command is built up by successive uses of INKEY$. To keep programming life simple, this version insists that with all numeric commands there *must* be a space after the command, before the numbers: and only whole numbers are recognised. Backspace delete is allowable, as is shift-backspace for deletion of a whole entry. Completion is signalled with CHR$(13) — 'ENTER' — in line 830.

A certain amount of jiggery-pokery with the 'color' set helps to simplify the PSETting and PRESETting of the graphics features, as in the clearing of the work-space and disappearance of the turtle in lines 930 to 990.

Next, in analysing the instruction, the first thing is to discover whether it is a single-word instruction (such as 'PENDOWN') or a numerical expression ('F 95', say). The distinction is made by looking for the mandatory space: the procedure also enables the part which is to be VALued to be separated out by line 1090.

Then the command is compared with the array of acceptable instructions (DATA of line 160) in the loop of lines 1100 to 1120. If the instruction is unrecognised it falls through the loop and, in common with some other illegal commands, causes a 'REDO' signal (line 1040) to be displayed for a few seconds before inviting a fresh attempt.

At last, three-quarters of the way through the program, comes the easy bit — doing the turtle graphics!

Forward and Back are identical apart from direction: line 1150 decides on that detail. Similarly, Left and Right differ only by the sign in lines 1260 and 1280.

But FC errors would abound if precautions were not taken to avoid trying to draw on the plastic surround of the TV screen. So lines 1180 to 1420 issue 'REDO' instructions rather than attempt any such thing.

Whether the turtle should be visible or not is remembered by the simple index M, one or zero. But there are three mutually exclusive alternatives as regards records of movement: none at all is PENUP with index J set 1 whereas PENDOWN is the default 0 and the obliterating RUBBER has J 2.

So there are few problems in producing the lines and circles. Many a computer could do as well. But how can the turtle be moved on without leaving a gap in the drawn lines where they coincided with the turtle outline? This is where the Dragon's PUT and GT come into their own, allowing the turtle to be treated as a separate entity, stored in a memory array. So it can be put 'on top of' the geometry or artistry being worked on, and removed without leaving any scars.

Just a couple of points of clarification to conclude. You *do* have to command PENDOWN again after use of RUBBER. And the difference between CLEAR and START is simply that START returns the turtle to the initial position whereas CLEAR leaves it wherever *you* left it.

So have fun! If anyone accuses you of wasting time you can always explain that you are swatting up on the principles of trigonometry by fitting circles into or round irregular triangles and what-not.

Figure 1

```
10 REM MINILOGO
20 CLS
30 PRINT @36,"A SMALL VERSION OF logo
40 PRINT "     ======================": PRINT
50 PRINT "REMEMBER logo COMMANDS:": PRINT
60 PRINT " fORWARD OR bACK (& A DISTANCE)"
70 PRINT " lEFT OR rIGHT (& AN ANGLE)"
80 PRINT " circle (& A RADIUS)"
90 PRINT " penup OR pendown OR rubber"
100 PRINT " hide OR show THE TURTLE"
110 PRINT " clear THE LINES OR start AGAIN"
120 PRINT: PRINT "THE AREA IS 256 UNITS BY 192."
130 REM >>>>>>>>>> Initialisation
140 CLEAR 1000
150 DIM B$(12),H$(10),L$(29),N$(9),S(20,20)
160 DATA F,B,R,L,PENUP,PENDOWN,RUBBER,HIDE,SHOW,CIRCLE,CLEAR,START
170 FOR L=1 TO 12: READ B$(L): NEXT L
```

```
180 REM >> Character graphics
190 L$(1)="BR1U4E2RF2DNL5D3"
200 L$(2)="BR1U6R4FDGNL3FDGL3"
210 L$(3)="BR6L4HU4ER4"
220 L$(4)="BR1U6R4F2D2G2L4"
230 L$(5)="BR1U6R6BD3BL2L4D3R6"
240 L$(6)="BR1U6R6BD3BL2L4"
250 L$(7)="BEU4ER4FBD2NL2D2GL4H"
260 L$(8)="BR1U6BR6D6U3L6"
270 L$(9)="BR2R4L2U6L2R4"
280 L$(10)="BEFR3EU5"
290 L$(11)="BR1U6BR4G4EF3"
300 L$(12)="BR1NU6R5"
310 L$(13)="BR1U6F3E3D6"
320 L$(14)="BR1U6F6U6"
330 L$(15)="BEU4ER4FD4GL4H"
340 L$(16)="BR1U6R4FDGL4"
350 L$(17)="BR6L4HU4ER4FD4GBUHF3"
360 L$(18)="BR1U6R4FDGL4R2F3"
370 L$(19)="BEFR3EUHL3HUER3F"
380 L$(20)="BR4U6L3R6"
390 L$(21)="BR1BU6D5FR4EU5"
400 L$(22)="BR1BU6D3F3E3U3"
410 L$(23)="BU6D4F2E2NU4F2E2U4"
420 L$(24)="BR1E6BL6F6"
430 L$(25)="BR4U3E3BL6F3"
440 L$(26)="BR7L6E6L6"
450 L$(27)="BR5L2U6R2"
460 L$(29)="BR3R2U6L2"
470 N$(1)="BR4U6G"
480 N$(2)="BR6L4U2ER2EUHL2G"
490 N$(3)="BR2R3EUHNL3EUHL3"
500 N$(4)="BR5U6G4R5"
510 N$(5)="BE1FR2EU2HL3U2R4"
520 N$(6)="BE2ER2FDGL2HU4ER2"
530 N$(7)="BR3U3E3L4"
540 N$(8)="BE2ENR2HUER2FDGFDGL2HU"
550 N$(9)="BR3R2EU4HL2GDFR2"
560 N$(0)="BR2BUU4ER2FG4FR2EU4"
570 PMODE 4,1: PCLS
580 E=128: S=91: A=0: R=57.29577951
590 LINE(0,184)-(255,191),PSET,BF
600 GOSUB 660
610 PRINT @480,"PRESS ANY KEY TO START....";
620 IF INKEY$="" THEN 620
630 SCREEN 1,1
640 GOTO 760
650 REM >>>>>>>>>> Turtle-draw subroutine
660 IF M=1 THEN RETURN ELSE COLOR 5,0
670 HE=E+8*SIN(A): HS=S-8*COS(A)
680 LE=E-4*COS(A): LS=S-4*SIN(A)
690 RE=E+4*COS(A): RS=S+4*SIN(A)
700 LINE(HE,HS)-(LE,LS),PSET
710 LINE-(RE,RS),PSET
720 LINE-(HE,HS),PSET
730 CIRCLE(HE,HS),2
740 RETURN
750 REM >>>>>>>>>> Compile an instruction
760 DRAW "BM3,186;C0ER2FG2BD2D"
770 C=0: D$=""
780 LINE(9+C*9,185)-(18+C*9,191),PSET,BF
790 C$=INKEY$: IF C$="" THEN 790
800 D=ASC(C$)
810 E$="BM"+STR$(9+C*9)+",191;C0"
820 IF D=21 THEN LINE(9,185)-(18+C*9,191),PRESET,BF: GOTO 770
830 IF D=13 THEN GOTO 930
840 COLOR 5,0: LINE(9+C*9,185)-(18+C*9,191),PSET,BF: COLOR 0,5
850 IF D=8 AND C>0 THEN C=C-1
860 IF D=8 THEN D$=LEFT$(D$,C): GOTO 780
870 IF D=32 THEN 910
880 IF D>47 AND D<58 THEN DRAW E$+N$(D-48): GOTO 910
890 IF D>64 AND D<94 THEN DRAW E$+L$(D-64): GOTO 910
900 GOTO 780
910 D$=D$+C$: C=C+1
920 GOTO 780
930 LINE(0,185)-(255,191),PRESET,BF
940 IF M=1 THEN 1000 ELSE COLOR 0,5
950 LINE(HE,HS)-(LE,LS),PSET
960 LINE-(RE,RS),PSET
970 LINE-(HE,HS),PSET
980 CIRCLE(HE,HS),2
990 PUT(E-10,S-10)-(E+10,S+10),S,PSET
1000 REM >>>>>>>>>> Analyse an instruction
```

```
1010 DA$="": F=0: G=0
1020 F=INSTR(1,D$," ")
1030 IF F<>1 THEN 1090
1040 DRAW "BM210,191;C0"+L$(18)+"BR2"+L$(5)+"BR2"+L$(4)+"BR8"+L$(15)
1050 FOR L=1 TO 900: NEXT L
1060 COLOR 5,0: LINE(210,185)-(255,191),PSET,BF
1070 GOSUB 660
1080 GOTO 760
1090 IF F=0 THEN DA$=D$ ELSE DA$=LEFT$(D$,F-1): G=VAL(RIGHT$(D$,LEN(D$)-L
EN(DA$)-1))
1100 FOR L=1 TO 12
1110 IF DA$=B$(L) THEN ON L GOTO 1150,1150,1260,1280,1300,1320,1340,1360,
1380,1400,1480,1540
1120 NEXT L
1130 GOTO 1040
1140 REM >>>>>>>>>> Forward and Back
1150 IF L=2 THEN G=-G
1160 EE=INT(E+G*SIN(A)+.5)
1170 SS=INT(S-G*COS(A)+.5)
1180 IF EE<10 OR EE>245 OR SS<10 OR SS>173 THEN 1040
1190 IF J=0 THEN LINE(E,S)-(EE,SS),PRESET
1200 IF J=2 THEN LINE(E,S)-(EE,SS),PSET
1210 E=EE: S=SS
1220 GET(E-10,S-10)-(E+10,S+10),S,G
1230 GOSUB 660
1240 GOTO 760
1250 REM >>>>>>>>>> Right
1260 A=A+G/R: GOTO 1220
1270 REM >>>>>>>>>> Left
1280 A=A-G/R: GOTO 1220
1290 REM >>>>>>>>>> PENUP
1300 J=1: GOTO 1220
1310 REM >>>>>>>>>> PENDOWN
1320 J=0: GOTO 1220
1330 REM >>>>>>>>>> RUBBER
1340 J=2: GOTO 1220
1350 REM >>>>>>>>>> HIDE the turtle
1360 M=1: GOTO 760
1370 REM >>>>>>>>>> SHOW the turtle
1380 M=0: GOTO 1220
1390 REM >>>>>>>>>> CIRCLE
1400 IF G=0 THEN 1040
1410 GE=G*SIN(A): GS=G*COS(A)
1420 IF E+GE<0 OR E+GE>255 OR S-GS<0 OR S-GS>183 THEN 1040
1430 PMODE 4,1
1440 IF J=2 THEN COLOR 0,5
1450 CIRCLE(E+GE,S-GS),G
1460 COLOR 5,0
1470 GOTO 1220
1480 REM >>>>>>>>>> CLEAR the lines
1490 PCLS0
1500 GET(E-10,S-10)-(E+10,S+10),S,G
1510 LINE(0,184)-(255,191),PRESET,BF
1520 GOSUB 660
1530 GOTO 760
1540 REM >>>>>>>>>> START again
1550 E=128: S=91: A=0: GOTO 1490
1560 REM MIKE HOSKEN.
```

If you've got a technical question write to Brian Cadge. Please do not send a SAE as Brian cannot guarantee to answer individual inquiries.

Dragon Answers

Blank Lines

I HAVE an early Tandy dot matrix printer which has given me many years of service with my faithful Dragon. I recently upgraded to the FLEX operating system and have found that there is no poke to stop a blank line appearing after every carriage return in a listing. There are no 'dip' switches on my printer so the solution must lie in software, can you help?

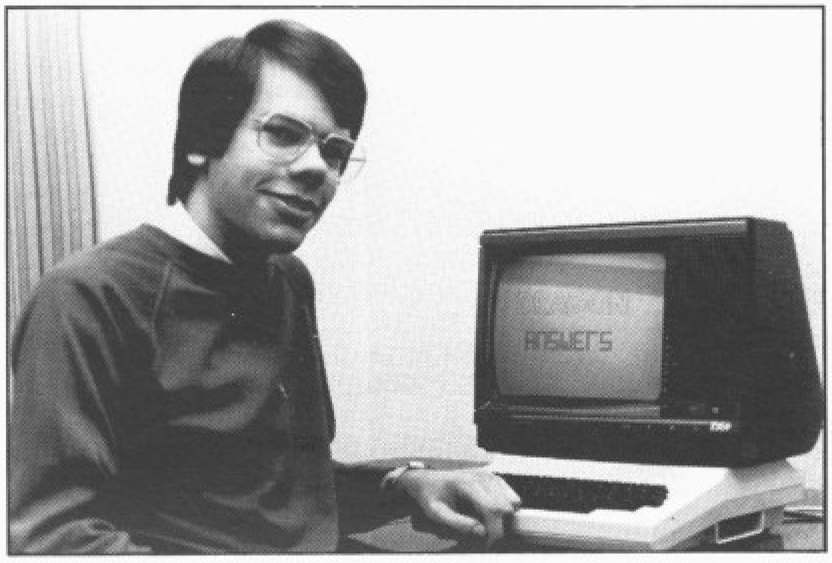
David Thomas
200 Hill Street
Huntstanton
Norfolk

YOU NEED to write a new printer driver for FLEX. Enter the one listed below into a file called TANDY.TXT using the text editor and assemble it into a binary file with ASMB TANDY PRINT.SYS

```
        ORG    $CCC0
PINIT   IRTS
PREDY   PSHS   A
        LDA    65314
        BITA   #1
        BEQ    BUSY
        ANDCC  #247
FIN     PULS   A,PC
BUSY    ORCC   #8
        BRA    FIN
*
        ORG    $CCD8
PCHK    BRA    PREDY
*
        ORG    $CCE4
POUT    BSR    PCHK
        BPL    POUT
        CMPA   #13
        BEQ    DONE
        STA    65282
        LDA    #2
        STA    65312
        CLR    65312
DONE    RTS
        END
```

Addresses

SOME TIME ago I purchased an I/O Port which was specifically designed for use in the cartridge port of the Dragon 32. I would now like to use this on the 64 version if possible. Addresses 49152 to 49155 are used to access the I/O Port on the Dragon 32. Could you please advise me if there are "equivalent" addresses on the Dragon 64?



M Scott
23 Chalfont Drive
Western Boulevard
Nottingham
NG8 3LS

UNFORTUNATELY, you do not say exactly which I/O port you have. However, because the address decoding of the Dragon 64 is more thorough than on the 32, the hardware 'short cut' of using these addresses as I/O ports, will not usually work.

There is not a simple solution, there are no equivalent addresses — I'm afraid the hardware has to be modified.

Baud rate code

I AM currently writing a communication program on my Dragon 64 using the built-in serial port. What I need to know is the formula for working out the baud rate code (1-15) to be poked from the actual baud rate required, this does not seem to be given in the manual.

Richard Smith
Staines
Middx

UNFORTUNATELY, there is no simple formula for converting the baud rate into the internal code required on the 64. The best solution I have found is to set up an array thus:

DIM BD(15)

and then fill in the array with the baud rate associated with the index of the array element. The following line would do this:

```
FOR I=1 TO 15:READ BD(I):NEXT:DATA
50,75,110,135,150,300,600,
1200,1800,2400,3600,4800,7200,
9600
```

When a baud rate is selected you can search for it in the array BD, the index of the matching element will give the correct internal code to poke.

Green Screen

COULD YOU answer the following short queries please?

Is it possible to permanently change the standard black printing on green background that the Dragon 32 produces. I have tried CLS 123 etc, but the screen reverts to green after enter is pressed.

Is it possible to reduce the noise level that issues from the TV speaker — when I run games software, the noise is so bad I have to turn the sound off.

Alan Burton
11 Imyaway
Lee Chapel South
Basildon
Essex SS16 5QR

IT IS not possible to change the text colour on the Dragon, except to inverse, and green or orange. You can intercept the character print routine to substitute one that prints green text on a black background, which is generally more readable. This vector is at loc 359 and should be a JMP to your own routine. This routine must first check that the channel number (stored in loc 111) is zero, and then print the character held in the A register. The routine should end with the instructions LEAS 2,S and RTS.

The second question is harder to answer. I have heard of this problem with a number of Dragons. The problem lies in the hardware and there is no simple way to eliminate the noise short of a repair job.

Transfer

IF ONE purchases a Dragondos disk drive for use with a Dragon 32, will it be possible to transfer one's own programs from cassette type to a disk easily and, if so, how?

L Mather
1 Ferney Green Drive
Windermere
Cumbria LA23 3HS

IT IS certainly possible to transfer your own programs from cassette to disk, providing they do not use every bit of memory — the Dragondos cartridge needs an additional 1.5K for its own use. To transfer a program, simply load it from cassette using CLOAD and save it to disk using SAVE. Similarly with machine code programs.

The only problem you may have here is if the program uses any of the memory between 1536 and 3071 which is reserved for the dos. This is the problem with many commercial games which you will not find very easy to transfer from cassette to disk.

Compiler

I AM looking for a BASIC Compiler for my Dragon 64K (Manufactured by TANO Corp.). Specifically, the Compiler must generate the machine code which can be loaded and executed from the EPROM cartridge or tape and must not require the presence of a diskette drive on the system.

C Persaud
24 Elsa Vineway
Willowdale
Ontario
M2J 4H9

THE MOST complete Basic compiler I have seen for the Dragon is DYNAFAST from Compusense (Reviewed in Dragon User Feb 1985). This can handle all the Dragon's Basic commands — even Dragondos extensions, and produces stand alone machine code.

The compiler costs £30 on cartridge or £20 on disk and is available direct from Compusense Ltd.

Expert's Arcade Arena

Write to 'The Expert' at Dragon User 12-13 Little Newport St, London WC2H 7PP. with all your arcade tips and hints.

GOODBYE

Well, how about that for a wacky beginning eh? I don't think any of you expected me to start like that did you? You did? Okay then you cocky swine. I'm going to start again. So there! Right, pretend you haven't read this bit. Ready. Then let's go.

Beetroot.

Ha, even better huh? So to business. A letter from someone who signs off 'Games Aficiondo'. Before I get down to his letter, I'd like to say something, and that is I'm not prepared to recieve letters from people writing under clever clever pen names. I'm the pretentious one here. Not you. Got it? Good.

So, Mr Games Cretin, thanks for your note, and here's his or her Pokes for all of my readers.

BEANSTALKER: Code is REGISTER
RUBY ROBBA: POKE 21117,125 for infinite lives.
ESCAPE: Code is '79245' but Poke 12401,33 allows anything.
BEAM RIDER: Crash with RESET button, then POKE 7783,lives or POKE 11840,13 for infinite lives. EXEC 7683.
CAVERNS OF CHAOS: Type PIGLET on title page. E moves on to the next screen.
DEATH MINES OF SIRUS: Codes are CBLW and TLL (Can anyone help me with the adventure parts — The Expert.)

Mr Games Pretentious Name goes on to present the long awaited program 'C' which breaks into any new Microdeal, Tom Mix, or Pocket Money game.

PROGRAM C:

```
10 PCLEAR1:CLEAR 10:FOR 1=1800 to 1851:READM:POKE I,M:NEXT:EXEC 1800
30 EXEC PEEK (1546)*256 + PEEK (1547)
40 DATA 134,126,183,1,142,48,140,28,191,1,143,141,31,141,34,134,3,151,0,142,64,0,141,9,10,0,38,247,190,64,12,159,0,126,183,91,158,0,141,7,141,2,53,144,142,6,0,159,126,126,185,51
```

Simply put a POKE on line 20 or turn line 30 from EXEC to PRINT and the Program will print up the EXEC address.

This should help with the POKES from earlier columns, and here's a few more that will work with it, all of which give infinite lives!

PENGON: POKE 11633,125
JET BOOT COLIN: POKE 8759,77:POKE 9099,77
TEA TIME: POKE 19996,109
SHOCK TROOPER (repeated by popular demand): POKE 17075,125

For those interested, the Games Aficionado is really Paul D. Burgin, who promises to reply to all those who write to him at the following address, as long as they send him an sae (do you know what you're actually letting yourself in for Paul?):

Paul D. Burgin, 18 Moorcroft Road, Fulwood, Sheffield, Yorkshire, S10 4GS.

Finally, Paul has won an award. The award goes to Paul for 'Most Crawly "I Want To Win An Award" Type Letter Ever Sent To An Arcade Column In A Publication Called Dragon User'. Congratulations Paul.

Now, to Robert Cassman's letter:

May I be so bold as to register a complaint (Not about me you can't — The Expert). It is concerning *Shaolin Master* by Quickbeam (Good job too — The Expert). What I find very annoying is the poor detecting when fighting. For example, the opponent may attempt to hit you even if you are some way off. This also happens with the leg sweeps and the high kick. Could you use your influence at Quickbeam and let them know of my complaint. Else heads may roll!!

Well, your complaint is now in print and knowing Dave at Quickbeam, he'll take a lot of notice of your complaint ('cause they're very keen to please) and I should think something will get done about it. I'll keep you posted.

The *Total Eclipse* savegame editor WILL work on the DRAGON 32 now. Just type Clear 200,31919 before running. Many thanks to Pam D'Arcy for saving the day. See you next month.



I'LL BEGIN with a long letter from regular reader Mathew Lodge, full of pleas, clues and news, probably enough to fill the whole column by itself — maybe this is a take-over bid? Get out, Lodge! Clues include how to get the elusive emerald in *Juxtaposition*, for which you must have the sender unit and the transmat receiver, then from outside the door where the emerald is you: REDNES ESU/INADIRE TEG/N/Q/REVIECER PORD. Mathew's wondering where to get a vidmessage: AREMAC EHT ESU. (And watch for a full solution to this game next month.) On the same game, Mathew comes up with some possible sources for Ceti V, firstly in Robert Heinlein's book *Starman Jones*, where a Ceti VI is mentioned as a planet, and in *Startrek II* where there was a Ceti Alpha VI planet with unbreathable atmosphere.

Watery entrance

In *Wizard of Akryz* Mathew suggests you try fighting in the dark when in the cave, and you should trust the fox and be prepared to follow him. In *Sorceror of Claymorgue Castle*, don't use the Sesame Seed spell to get you inside the castle — go for a watery entrance instead, you'll need Sesame later. To get your first star: SEERT TA ERIF TSAC.

This busy reader has also been writing his own 64x21 screen driver and integrated it into Dragon BASIC, and tells me that there's a chance that Roy Coates Microvision will be using it in an adventure they're thinking of releasing. Finally Mathew has finished lots of adventures, from Mysterious Adventures to Scott Adams, and would like to swop them for new challenges if anyone's interested. Write to Mathew Lodge, 'Maen Melin', Holmes Chaple Road, Lach Dennis, Northwich, Cheshire CW9 7SZ.And remember to spell his first name with only one 't' as he doesn't half get cross if you get it wrong!

Also on the look-out for adventures is Greg Southerden, 21 Courtfield Avenue, Lordswood, Kent ME5 8QR, and specifically for the graphics version of *Calixto Island* and *Black Sanctum*, which he's having difficulty tracking down. If you've solved them and want to sell them, contact Greg, who claims to be the worst adventure player in the world, which is why he has no finished adventures of his own to swop in return: he's currently stuck in about 30 different ones, he reckons!

A rocket from reader Ian Rockett, not aimed at me but at a French reader, Daniel Merkez, who Ian sent 15 programs to in a swap they'd arranged, but the return programs never arrived and nor have replies to Ian's several letters asking what's going on. So a warning there for everyone. Ian's letter goes on to list a routine that will let you inspect the data statements in many BASIC adventures, enabling you to look at verbs, nouns, responses and anything else held as data. Type the routine as one complete line, but without a line number: FOR A = 1 TO 23456: CLS: FOR B = 1 to 15: READ X$: PRINT X$: NEXT: EXEC 41194: NEXT. The 'B' loop makes the routine print out just 15 blocks at a time, so press any key to get the next block of 15. If you want it to run in 64 mode, change the EXEC to EXEC 57570. Anyone interested in routines like this and in programming generally can contact Ian at 2 Knowle Road, Burley, Leeds LS4 2PJ.

Bob Bernasoni of 16 Woodland View, Lanivet, Bodmin, Cornwall, is stuck in various places and would like to hear from anyone offering help on *Caverns of Doom* (how to get the mushrooms and avoid starvation); *Wizard of Akyrz* (how to get through the hen-house trapdoor); *Arrow of Death II* (how to get anywhere!) and *Operation Safras* (any help on Part Two.)

Also suffering in *Safras* is Mark Brocklehurst of 1 Park Avenue, Markfield, Leics, LE6 OWA, who wants to know the code that is asked for after answering Rythma's questions, which he'll now know if he's read the last couple of columns. Mark offers help on *Castle Adventure, Ring of Darkness, Mystery of the Java Star* and *El Diablero,* and also asks if anyone out there wants an adventure game freak as a penfriend. He doesn't say quite how freakish he is, but he seems quite normal from his letter. Mind you, how normal is an adventure player anyway?

Ray Thomas lives in a place called Solva, a good home for an adventurer, and what's more he's just solved *El Diablero*. Having breathed a sigh of relief for that, he's straight into *Wings of War*, where he asks what to do when confronted by the Kommandant, how to get a pass to get past the luger-toting guard, and how to open the toolbox. The second is solved by the first, which requires a simple: YRANOITCID GNIYRRA NEHW LIEH YAS. Can anyone help on the toolbox? Write to Raymondo at 40 Bro Dawel, Solva, Haverfordwest, Dyfed SA62 6TZ.

David Bird of Newport wants to know how to get into the castle in *Castle Adventure* — not that this has stopped him playing the game as he's fiddled with the program so he can begin the adventure inside the castle, but he wants to do it legitimately. As far as I remember, David, that's a simple matter of getting the right command, either GO DOOR or GO CASTLE, but if that doesn't work contact Mark 'Freak' Brocklehurst from two paragraphs ago.

Help needed on *Circus, Arrow of Death I, Ten Little Indians* and *Perseus and Andromeda* for Neil Huggins, 6 Monmouth Court, Hendredenny, Caerphilly, Mid Glamorgan CF8 2TG, and help offered in return on *Trekboer, Time Machine* and *Juxtaposition*. And with Neil's letter I've just noticed something that could be incredibly significant. These last three letters are the only ones this month without stamped addressed envelopes enclosed, which is why they're dealt with in the column rather than with personal replies. The significance? All three of them come from Wales! So it's not true what they say about the Scots being tightfisted, it's the Welsh all along! (Kindly address letters of complaint to the Race Relations Board.)

Closed Gates

Colin le Cornu is also from Wales, so those hillsides must really be ringing with the sound of keyboard bashing and frustrated adventurers. Colin's stuck in *Jerusalem Adventure*, being unable to open the Golden Gate, so keys or clues please to 153 Bowleaze, Greenmeadow, Cwmbran, Gwent NP44 4LG. He should contact A.D. Gow of 43 The Downs, Harlow, Essex CM20 3RE, who's solved *Jerusalem* as well as *El Diablero* and *Franklin's Tomb*. He (or she) is completely baffled on *Lost in Space* and *Fishy Business*, but so am I. I mean, wouldn't you just know it, someone writes in to ask about adventures I can actually answer problems on, and they forget to tell me what the problems are!

Paul Cooper asks how to get back once transported on *Syzygy*, and how to enter the command to get down the dark pit on the upper floor. He's been

told to hold the blanket and the string, but HOLD STRING, HOLD BLANKET and HOLD BLANKET AND STRING don't work. So what will? Paul is perplexed at 132 Packhorse Road, Melbourne, Derbyshire DE7 1BZ.

Anyone perplexed by *Dragon Mountain* should contact Steve Driver, 93 Valley View, Lemington, Newcastle Upon Tyne NE15 8BG, as Steve has solved that one, but needs help on *The Ket Trilogy* and *Juxtaposition*. See next month's column for clues galore, Steve.

There's been a lack of help so far this time, but let me finish with some more info on *Madness and the Minotaur* from Steve Barritt, who provided some details about the spells that I gave in an earlier column. Steve says he's happy to try to answer specific questions on the adventure, if anyone wants to ring him on 0327-706517, and he's there most evenings from about eight to ten o'clock. The following details on *1Madness* aren't going to be printed backwards, there are too many of them for that, but as so many people are stuck all over the place in this one I hope no-one will mind.

1st Floor: all items dropped in the music room will remain safe till needed, but dropped elsewhere they may be relocated by the sprite. There is always one spell room on this floor, to which you must take the mushroom and the food. To discover the items needed to get the spellbook, LOOK POOL. The Jewel box, tablet, scarab and scroll are Pseudo-treasures as they are found in the same locations as normal treasures but they don't score points, though some do have other uses. You can refill bottle with water from any pool on this floor, and drinking water adds 32 points to your condition. Eating food adds 30 points, and as you eat more food is relocated on floors one and two only.

Second Floor: at the start of each game this contains the urn, flute and skull, and also has three rooms To get these spells you'll need the parchment, talisman and rope from the fourth floor.

Third Floor: this always has the ax, mace, basket, mushroom and pendant, and is the most difficult level to map, being split into five different areas. Use the BACK command frequently as there are many one-way movements possible.

4th Floor: always contains at start of each game the parchment, talisman, rope, sceptre, goblet, glowing rocks, music room and a second pit. In the music room you'll need the flute, rope and parchment (play the flute and climb the ledge). For the glowing rocks use Okkan. The LOOK PIT command works at random times, so keep trying.

I also tend to work at random times, but with any luck the next time will be next month.

Adventure Contact

To help puzzled adventurers further, we are instituting an Adventure Helpline — simply fill in the coupon below, stating the name of the adventure, your problem and your name and address, and send it to Dragon User Adventure Help-line, 12/13 Little Newport Street, London WC2H 7PP. As soon as enough entries have arrived, we will start printing them in the magazine.

Don't worry — you'll still have Adventure Trail to write to as well!

Adventure ....

Problem ....

....

Name ....

Address ....

....

Adventure Contact

Adventure 1) Wings of War 2) Syzygy 3) Calisto Island **Problem** How to get past the guard? 2) Where to find the Huge Ugley Alien? 3) Where to get the oars? **Name** Alastair Scarlett **Address** 10 Lytoton Road, Hatch End, Pinner, Middlesex HA5 4RH. Tel. 01-428 1713.

Adventure Franklin's Tomb **Problem** I am stuck and I cannot find the wine cellar or get out of the pit. **Name** Jonathan Millar **Address** 137 North Cray Road, Sidcup, Kent DA14 5HE.

Adventure Syzygy **Problem** Fighting radar and using the transporter **Name** A. Stoneman and J. Saxton **Address** 30 Cannon Park Road, Coventry CV4 7AV.

Adventure Juxtaposition **Problem** How do I get the emerald and the Deed of Brown and the transmat belt? **Name** Gary Codling **Address** 219 Beehive Lane, Great Baddow, Chelmsford, Essex.

Adventure Syzygy **Problem** What do you do when you get to the computer. How do you get to the planet and back up? Where is the light sabre, how do I set the co-ordinates right? **Name** ???**Address** 43 Falmouth Road, Abbeydale, Sheffield S7 2DG.

Adventure: Williamsburg Adventure 3 **Problem:** How do you get over the wall to the secret passage without being shot by the police? **Name:** D.H. Moores **Address:** 15 Parkwille Road, Prestwich, Greater Manchester MR5 5QG.

Adventure: Juxtaposition **Problem:** How do I survive in the volcanic cave in the yellow sector? Where are the yellow and brown ID cards? **Name:** Fraser J. Chadburn **Address:** 47 Ibbett Close, Kempston, Beds MK43 9BU

Adventure: Ring of Darkness and Madness and The Minotaur **Problem:** Need any help I can get, I keep getting killed. **Name:** Andrew Miller **Address:** 5 Lenham Close, Billingham, Cleveland TS22 5RJ

Adventure: El Diablero **Problem:** Everything. I can offer help with Sea Quest and Keys of the Wizard. **Name Christina Garcia-Verdugo Address c=Illescas No. 145, 8oB 28024, Madrid, Spain.**

Adventure: The Emperor Must Die! **Problem:** What is the code name at the end of the action game? **Name:** Edward Brown **Address:**31, The Drive, Barwell, Leicester, LE9 8LA.

Adventure: see question **Problem:** How many levels in Chuckie Egg? How many treasures in Cuthbert in the Jungle, how to get POKE in D.U. March 1986 to work for Cuthbert in Space? **Name:** Paul Palmer **Address:** 15 Underhill Road, Matson, Gloucester GL4 9HB.

Adventure: Juxtaposition **Problem:** How to fill the punctured inner tube and could someone send a map? **Name:** Alex Stoneman **Address:** 30 Cannon Park Road, Cannon Park, Coventry, CV4 7AY.

Adventure: Syzygy — Mansion of Doom **Problem:** Everything, can't get very far, please help. **Name:** Neil Kendall **Address:** Roskear, Grampound, Truro, Cornwall.

Adventure: Madness and The Minotaur **Problem:** Could I have the help sheet please? South, Fleet, Hants GU13 4SB.

Adventure: Juxtaposition **Name** Nicholas Payne: **Address:** 47 Reading Road **Problem:** How do I get the white key card from the old caretaker? Where is the mask? **Name** Bjarne Robstad: **Address:** Skjerhauga Ne 36, 4900 Vennesla, Norway.

Adventure: Juxtaposition **Problem:** How to get the Iridani Emerald off the pedastal without getting gassed? **Name:** Dominic Leary **Address:** 27, Fishers Lane, Pensby, Wirral, Merseyside LE1 9NT.

Adventure: The KET Trilogy= Temple of Vron **Problem:** What to do with the Alien that is gasping for breath? How to get over the loud river? **Name:** David Hadfield **Address:** 26 Meadow Avenue, Preesal, Blackpool FY6 OHA.

Adventure: Trekboer **Problem:** How do you get onto the planet? Is there oxygen needed to stay alive on the planet? How do you get past the planet and everything after? **Name:** Ryan Henderson **Address:** 2 East Clapperfield, Edinburgh, Scotland EH16 6TU.

Prime Examples

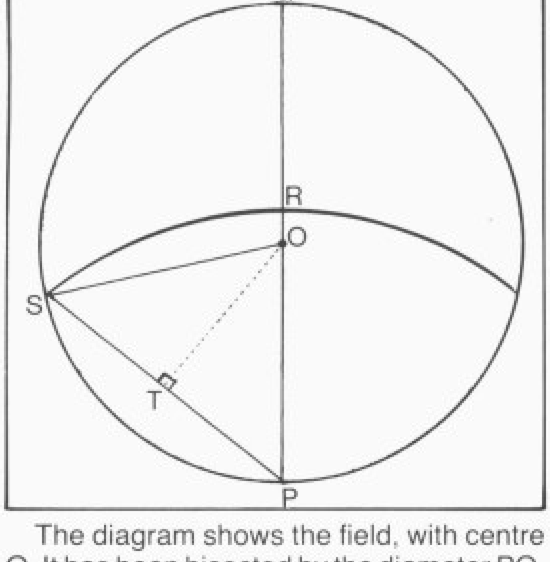
***Gordon Lee** sends a Dragon to catch a wild goose or two.*

LAST MONTH on this page, we printed a number of short puzzles which might amuse the reader. The solution to question 1 was given last month. Here are the solutions to numbers 2, 3, and 4.

2. For this problem we were required to rearrange the nine digits (1 to 9) to form the lowest possible, and highest possible, primes. Now, a prime number is one which does not have any whole-numbers factors apart from itself and one. Unfortunately, there is no easy way of determining if a given number is prime or not, apart from trial divisions. Theoretically, if a given number is divided by all primes smaller than, or equal to, the square root of that number, and an exact division is not found, then that number is prime. Consequently, the testing of nine-digit numbers is still quite a lengthy procedure. Couple to this is the fact that the nine digits can be arranged in over a third of a milion different ways, and so the tasks seems quite formidable!

However, at the beginning of last month's article was a word of caution to the effect that not too much reliance should be placed on using a computer method of solution. A simple mathematical rule states that if the sum of the digits of a number is divisible by 3, then that number is is also divisible by 3. Now, the digital sum of the digits 1 to 9 is 45, and, as 45 is divisible by 3, any arrangement of the same digits in any order will always give a number which itself is divisible by 3. Consequently, that number cannot be prime! My apologies to any readers whose 'Dragons' are still ticking over on that one, looking for an answer which does not exist!

3. By contrast, this problem is an excellent example in which the computer is an invaluable tool in its solution. Indeed, there is no way of solving it by conventional mathematics except by 'trial and error'. This is the method that the computer uses, but the computer's ability to perform rapid and repetitious calculations makes it a task ideally suited to this method of approach.



The diagram shows the field, with centre O. It has been bisected by the diameter PQ. For convenience, only half of the field will be considered, and the radius of the field will be taken as unity. In the diagram:

OS=OP=1 (the radius of the field)

P is the point of attachment of the rope to the fence, and PR=PS (the length of the rope, L).

In the semi-circle, the area reached by the goat is that bounded by the two arcs RS and PS, and the line PR. This is equal to the area of the sector of the circle centre O and radii OS and OP, *plus* the area of the sector of the cirle centre P and radii PR and PS, *minus* the area common to both — that is the triangle OSP. With a correct value for L, this should equal one quarter of the area of the field. In the listing given, the length is intitially set at a value of 1.5, and this value is constantly amended depending on the result of the calculations. Unfortunately, the mathemetics used in this listing are complicated because of having to convert all angular measures to radians, and, because of the lack of an inverse cosine command on the 'Dragon', we need to use a circuitous method of calculation using the arctangent command.

```
10 PI=3.1415926
20 L=1.5
30 D=L★L★(PI/2−ATN(L/SQR
   (4−L★L)))/2
40 B=ATN)L/SQR)4−L★L))
50 S=(2+L)/2
60 T=SQR(S★(S−1)★(S−1)★
   (S−L))
70 A=D+B−T
80 PRINT A, PI/4
90 IF ABS(A−PI/4)<1E−8 THEN
   120
100 L=(L/A)★(PI/4)
110 GOTO 30
120 PRINT"THE LENGTH OF ROPE
    IS";100★L;" FEET"
```

This gives a final value of 115.87285 feet.

Readers who are interested will, no doubt, be able to recognise the various geometrical formulae used in this program. A more detailed account of this 're-iterative' method of solution can be found in the March '86 issue.

4. The solution to this problem, like that of problem 2, is one for which your computer will search in vain! For any square (s), such that $s=n^2$ the following equation also applies:

$$(s-1) = (n-1)\ (n+1)$$

Thus, one less than a perfect square is always non-prime (except where n=2 and so n−1 becomes 1). To demonstrate this graphically, lay out 16 coins in a 4 by 4 arrangement. Now remove the bottom right-hand coin. Note how the remaining three coins on the bottom row can now be placed alonside the top three rows to produce a 3 by 5 arrangement. This general principal will apply to any square, however large.

Now for this month's competition. Consider the following series of words: *startling, starling, staring, string, sting, sing, sin,* and *in.* Each word is formed from the preceding word by simply deleting a single letter at each step. This month, you have to find a similar series, but using numbers instead of letters:

— — — — — — — —	(a perfect cube)
— — — — — — —	(a prime number)
— — — — — —	(a multiple of 7)
— — — — —	(a prime number)
— — — —	(a perfect square)
— — —	(a prime number)

Note that you are not allowed to have 'leading zeros' in any step, so, for instance, the cube 30080231 could not be converted to the prime 80231. How many solutions can you find?

Prize

We're departing a little from our usual custom this month by offering prize vouchers instead of a name game. Construct Gordon Lee's inverted pyramid, and you could win one of 20 vouchers giving you £3 off any program in John Penn Discount Software's current stock. JPDS's range includes a wide selection of disk utilities as well as old and new games, so the choice is yours.

Rules

When you have solved (you believe!) the puzzle on the page above send us a printout of your program (no cassettes) and any explanation you want to include on how you arrived at your conclusion. Please mark the envelope SEPTEMBER COMPETITION, and don't forget your name and address.

To give us a tiebreaker, complete the phrase "Oh, little flower upon the ground . . ." using your wit and skill.

June winners

The winners of Smithson Computings Gordon Bennett are: Colin Merryweather of Northampton, Jorn Radek of Rodenbach, C. Hitchinson of Beechwood, F.J. Taylor of Acklam, D. Moutrie of Rainham, W. French of Greenhithe, Chris Morrissey of Goostrey, Rolf Michelsen of Steinkjer, Chris Jolly of Grove Park, Henk Bender of Klaaswall, Nigel Dawes of Clehonger, M. Graham of Bangor, P.A. Jamieson of Stockton-on-Tees, Ray Woods of Ilford, Keith David of Crawley, S.P. Greenford of Ingatestone, Robin Telkman of Sale, R. Christon of Thirsk, and P Elkouby of Garges-le-Gonesse, who takes us to task for finding his last entry too subtle. No problems this time: "Bathrooms can be dangerous because.....(Yum yum).....(Roar).....N.N.N. NOOOooo.....(belch)."

Solution

A great many people calculated correctly that the number which only repeats after four operations is 2916.

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